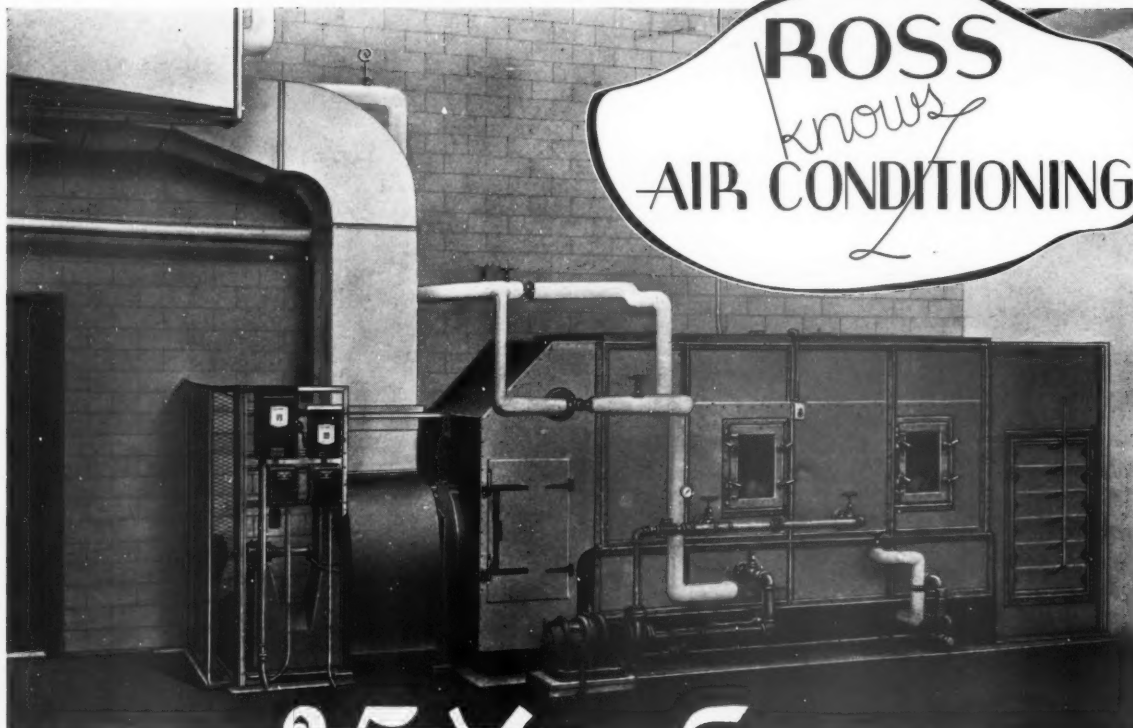


The Pacific Pulp & Paper Company's New Research and Experimental Laboratory at Bellingham, Washington, which symbolizes the great progress achieved through scientific research in the production of quality pulps on the Pacific Coast, since the famous mill made its first bleached sulphite in 1927.

# PACIFIC PULP & PAPER INDUSTRY

MAY • •

No. 5 • Vol. 10



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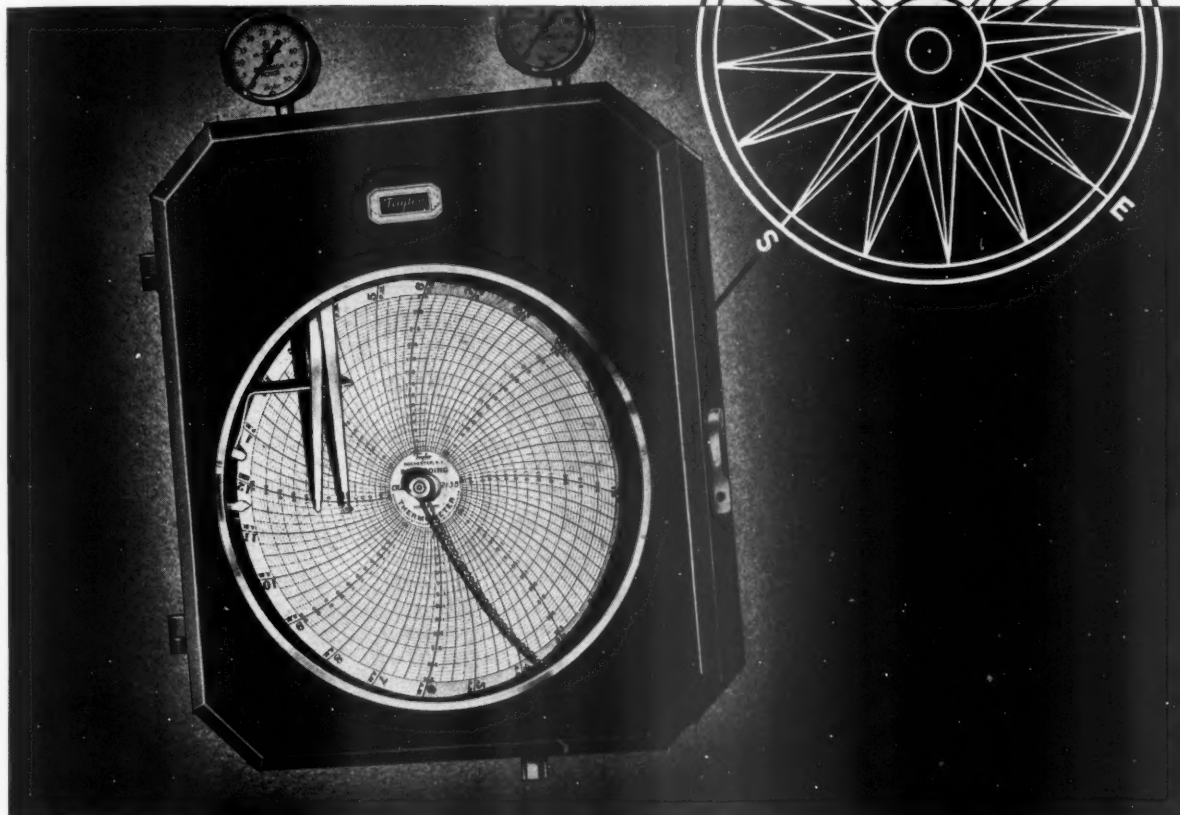
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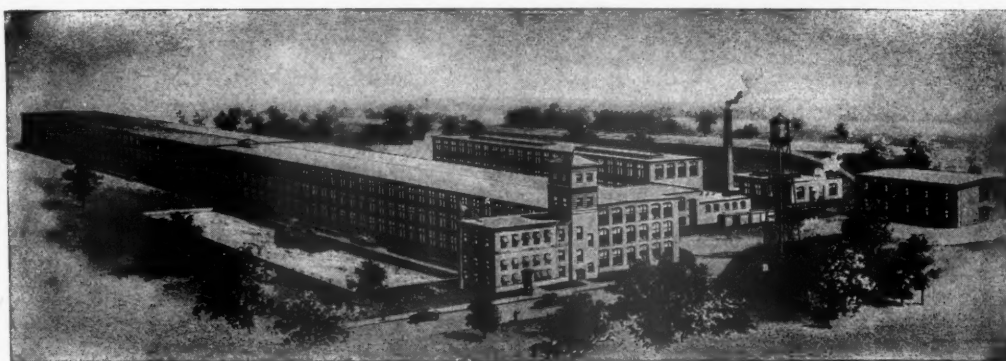
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# PACIFIC PULP & PAPER INDUSTRY

*The Journal of the Pacific Coast Industry*

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MAY • 1936

## ST. REGIS TO RE-OPEN TACOMA PULP MILL

Mr. Roy K. Ferguson, president of the St. Regis Paper Company of New York, recently announced that the company plans to resume operations at its Tacoma, Washington, kraft pulp mill this fall. Mr. Ferguson issued the following statement:

"Following studies of conditions in foreign and domestic pulp markets, St. Regis Paper Co. has decided to reopen and operate the pulp mill of its subsidiary, St. Regis Kraft Company at Tacoma, Washington. A substantial amount of money has been appropriated for the reconstruction of the plant in order to manufacture high grade bleached and unbleached pulp with an annual capacity of fifty five thousand tons. It is expected that the reconstruction of the plant will be finished and operations started in the fall of this year.

"The parent company and affiliated companies are large users of the type of pulp to be produced in this plant. Any portion of the output not used in this manner will be sold in the open markets both foreign and domestic.

"The company believes that the expenditures for raw materials, labor, etc., will be a material addition to the industrial activity in the City of Tacoma and that in so doing it will make a substantial contribution toward permanent employment in the city. The municipality will receive from the new enterprise a large income for power and water in addition to taxes and other benefits.

"The direction of the reconstruction and subsequent operation of the enterprise will be in charge of Mr. Ossian Anderson, Everett, Washington, who has assumed the position of executive vice-president of St. Regis Kraft Company, and who will be assisted by Mr. W. W. Griffith, resident manager of St. Regis Paper Company interests in Tacoma.

"The company wishes to express to the city officials of Tacoma its appreciation of the efforts put forth by them in the negotiations involved in our consideration of the reopening of this enterprise and we look forward to the continuance of this pleasant relationship for the mutual benefit of both the city and the company."

### Mill Built in 1928

The St. Regis Kraft Company's Tacoma pulp mill was constructed in 1928, going into production the latter part of that year on shredded kraft pulp.

Designed by Mr. Hardy S. Ferguson of New York, pulp and paper mill engineer, the plant is of modern steel, brick and concrete construction. It was built by the Union Bag & Paper Power Corporation, a subsidiary of the Union Bag & Paper Company. In 1931 title to the Tacoma mill was transferred to the St.

Regis Kraft Company, a subsidiary of the St. Regis Paper Company. Due to the decline in the price of kraft pulp the mill was closed down in the spring of 1932 and has not operated since.

The St. Regis mill is well located on the Tacoma waterfront and in addition to excellent salt water shipping facilities it is served by rail connections permitting shipments over four transcontinental rail lines.

During the period that the mill has been shut down the equipment has been kept in operating condition.

### Process and Equipment Changes

While full information on the changes to be made in the manufacturing process are not available at this time, PACIFIC PULP & PAPER INDUSTRY understands that the following principal changes will be made in the pulp mill.

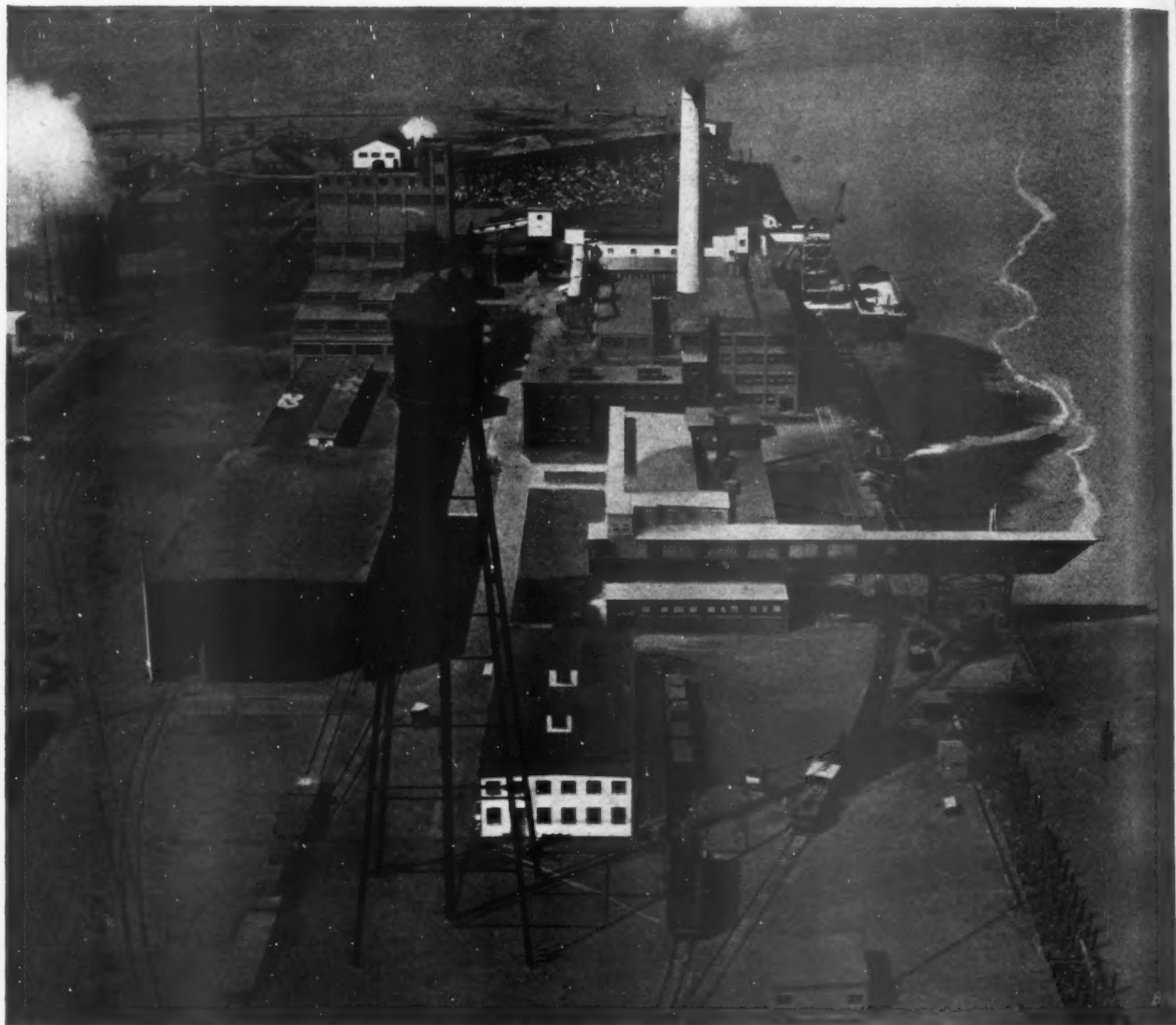


OSSIAN ANDERSON  
Executive Vice-President  
St. Regis Kraft Company



W. W. GRIFFITH  
Resident Manager  
St. Regis Paper Company, Tacoma





THE ST. REGIS KRAFT COMPANY'S KRAFT PULP MILL AT TACOMA, WASHINGTON

which will resume operation in the fall of this year with an annual capacity of 55,000 tons of kraft pulp, bleached and unbleached.

A complete bleaching plant of special design will be added and the mill will produce a high grade bleached pulp.

A new sawmill and chipping plant will be built and special equipment will be installed to produce the cleanest possible chips from logs.

Additions will be made to the boiler plant and to the power equipment.

A new screen room and a riffler room will be added to provide dual screening for the stock.

The present drying equipment will be replaced by two fourdrinier wet ends followed by hot air sheet dryers of special design, equipped to dry the pulp in sheets according to the latest practice for the preservation of color, strength and beating qualities.

The waste liquor recovery plant will be rebuilt along the most modern lines.

Reconstruction of the St. Regis Kraft Company's Tacoma mill is already under way. The engineering is in charge of Hardy S. Ferguson & Company of New

York City, pulp and paper mill engineers, who designed the mill in 1928 and supervised its construction. Mr. Ferguson spent several weeks on the Coast arriving early in May.

Mr. H. D. Cavin is resident engineer in charge of the reconstruction work. The Wright Construction Company are the general contractors.

#### Mr. Ossian Anderson

Mr. Ossian Anderson is president and general manager of the Puget Sound Pulp & Timber Company of Bellingham, Washington. This journal understands that the planning of the reconstruction of the Tacoma pulp mill has been under his direction, and that he will devote such time as is required to the reconstruction and the subsequent operation of the Tacoma mill in the capacity of a director of the St. Regis Kraft Company resident on the Pacific Coast, in addition to his present position as executive officer of the Puget Sound Pulp & Timber Company.

#### PRINCE RUPERT PROJECT STILL IN FINANCING STAGE

Frank L. Buckley, managing director of the Canadian-American Pulp & Paper Company, sponsoring a new pulp and paper mill at Prince Rupert, has been spending the last few weeks in New York with Edward A. Thompson, of San Francisco, one of the directors. Object of the trip was to complete financing and to continue negotiations for a market outlet for bleached sulphite pulp, which will be one of the company's chief products.

Construction plans are still marking time, despite earlier announcements that work on the mill would be under way by the beginning of May. At Mr. Buckley's Vancouver office it was stated that satisfactory progress was being made and that as soon as Mr. Buckley returned a definite announcement would probably be made concerning construction.



## SUPERINTENDENTS AND TAPPI TO HOLD MEETING AT LONGVIEW JUNE 5th and 6th

Nine interesting papers on a variety of subjects will be the feature of the joint spring meeting of the Pacific Coast Division of the American Pulp & Paper Mill Superintendents' Association and the Pacific Section of TAPPI, which will be held June 5th and 6th at the Hotel Monticello in Longview, Washington.

The papers will be followed Saturday afternoon, June 6th with a round table discussion of operating problems which will be led by Mr. George W. Brown, chairman of the Superintendents and by Mr. William R. Barber, chairman of TAPPI.

### The Papers

A subject of more than usual interest to operators will be discussed by Mr. Herbert Peterson of the Pulp Division, Weyerhaeuser Timber Company, Longview, in his paper, "Instrumentation in the Pulp Mill". Mr. Peterson, who is in charge of instruments for Weyerhaeuser, has made a thorough study over a period of years of their use in the control of pulp production. The industry will find his work presented from the operator's viewpoint, to be an exceptionally valuable contribution to the at present insufficient literature on the experience of mill operators with control instruments.

Mr. Claire V. Smith, electrical engineer of the St. Helens Pulp & Paper Company, St. Helens, Oregon, will present a paper developed from his extensive experience on "Maintenance of Electrical Equipment in the Pulp and Paper Mill".

"Paper Mill Slime" will be the subject of Mr. George Douglas chief chemist of the Washington Pulp & Paper Corporation, Port Angeles, Washington. Mr. Douglas has been studying the problem of slime in connection with groundwood and news print for a considerable period of time, and his paper will contain the results of the studies at Port Angeles.

"The Log Break-Down Plant of the Washington Pulp & Paper Corporation at Port Angeles", will be the subject of a paper by Mr. F. W. Horskotte, consulting sawmill engineer of Portland, Oregon. This modern wood preparation plant possesses many features of interest.

Mr. R. T. Petrie, Pacific Coast representative for the Bagley & Sewall Company will talk on "Paper Mill Machinery," and will illustrate it with moving pictures.

"Sulphur Dioxide Absorption Losses", will be discussed by Dr. W. L. Beuschlein of the Department of Chemistry, University of Washington. This paper represents the results of extensive studies made in the university laboratories and in the field.

"Opacifying Properties of Titanium Dioxide" by Mr. W. R. Willets of New York, will probably be read by title. Mr. Willets will be present to discuss the subject and answer questions at the round table meeting.

"Treatment of Boiler Feed Water in the Pacific Northwest", will be presented by Dr. K. A. Kobe of the Department of Chemistry, University of Washington. He will offer the results of studies made over a period of several years of the boiler feed water problems in this region.

"The Tomlinson Waste Liquor Recovery Unit for Kraft Mills", will be discussed by Mr. L. S. Wilcoxon of the Babcock & Wilcox Company.

### Registration Friday Noon

Registration for the joint spring meeting will open Friday noon at the Hotel Monticello. The first meeting will start at 1:30 p.m. Friday, June 5th. Each paper will be followed by a discussion period.

Saturday morning the business session will start at 9 o'clock and will last until noon. At 1:30 p.m. the meeting will be resumed and the last paper will be fol-

lowed by the general round table discussion.

### Ladies Program

An interesting program for the ladies attending the meeting is being arranged by Mrs. H. R. Heuer of Longview.

The ladies are invited to attend the Friday luncheon.

Friday evening there will be a dinner-dance at the Hotel Monticello. Saturday evening a banquet will be held followed by a dance.

A golf tournament is being planned and mill visits are being scheduled for those who wish to see the Longview Fibre Company, the Pacific Straw Paper & Board Company and the Pulp Division of the Weyerhaeuser Timber Company.

### A Valuable Meeting

The joint spring meeting of TAPPI and the Superintendents' Association has been planned to provide a maximum of helpful information for mill operators, technicians and executives. The round table discussion which has proved of great interest at previous meetings will again offer the opportunity for the exchange of ideas.

Mr. H. R. Heuer, operating superintendent of the Pulp Division, Weyerhaeuser Timber Company in Longview, is general chairman of the meeting. For TAPPI the following committee worked out the program under the direction of Mr. Carl Fahlstrom, technical superintendent of the Longview Fibre Company, and committee chairman: Dr. H. K. Benson, Mr. Erik Ekholm, Mr. George McGregor, Mr. George Douglas, Dr. E. C. Jahn, Dr. Leo Friedman and Mr. Brian Shera.

For the Superintendents' Association Mr. George Cropper, first vice-chairman of the Pacific Coast Division, and Mr. H. A. DesMarais, secretary-treasurer of the Pacific Coast Division, participated in arranging the program.

### DR. HIBBERT HONORED BY UNIVERSITY OF B. C.

Dr. Harold Hibbert of Montreal was a Pacific Coast visitor early in May. He came West to receive an honorary L.L.D. degree from the University of British Columbia in Vancouver, and afterward visited several pulp mills in Washington.

While in Seattle Dr. Hibbert, who is E. B. Eddy Professor of Industrial and Cellulose Chemistry at McGill University, Montreal, talked before the American Chemical Society at the University of Washington.

Dr. Hibbert spoke of the progress made in recent years in the research work on the chemistry of cellulose and lignin. During the course of his talk he offered examples of the practical application of recent cellulose and lignin discoveries, some of which were made at McGill.

As a result of the McGill research work on lignin, Dr. Hibbert said, a commercial plant for the extraction of

vanillin from waste sulphite liquor was being constructed. He said that as chemists learned more of the chemistry of cellulose and lignin the uses of these materials would be broadened to an extent that definite prophesies would be futile.

### ELON HOOKER VISITS TACOMA PLANT

Mr. Elon H. Hooker, president of the Hooker Electrochemical Company of New York, visited the company's Tacoma chlorine and caustic soda plant in May.

While on the Pacific Coast Mr. Hooker talked before the Tacoma Chamber of Commerce and the Tacoma Engineer's Club.

### BOB HEUER HONORED

Mr. H. R. Heuer, operating superintendent for the Pulp Division, Weyerhaeuser Timber Company, Longview, was elected vice-president of the Longview Young Mens Christian Association on May 12th.

### HARDY FERGUSON VISITS COAST

Mr. Hardy S. Ferguson of New York, well known pulp and paper mill engineer was on the Coast early in May in connection with the engineering of the reconstruction work he is handling for the St. Regis Kraft Company in Tacoma.

Mr. Ferguson's organization designed and supervised the construction of the Tacoma mill in 1928, and also the Soundview Pulp Company's mill in Everett, which was completed in 1930.

His organization is now engaged in supervising the building of the 160 ton per day kraft pulp and paper mill for the Crossett Lumber Company at Crossett, Arkansas. The designing was completed in February of this year and construction began in March. The mill is scheduled to be completed in the early part of 1937.

Of the 160 tons per day of kraft pulp, 110 tons will be converted into paper at the mill, the remaining 50 tons dried and sold in the market.

# RAINIER LOOKS AHEAD

**T**HE importance of the timber resources of the Pacific Coast has long been recognized in world-wide affairs; first, in production of lumber, in which it has been a leader for many years; and latterly in the production of woodpulp, largely of sulphite nature. During the past few years pulp producing companies have emphasized the improvement of quality of these pulps, and the Rainier Company has been one of the leaders in this trend. The completion of the new Research Laboratory at Shelton in March, 1936, marked an important step in the progress of West Coast pulps.

About a year ago Mr. E. M. Mills, president of the Rainier Pulp & Paper Company and his associates in the company demonstrated their confidence in the future of this industry on the Pacific Coast by deciding to establish new laboratories for the purpose of development and research on the specialty products in which this company has been interested for some time. The plans for these laboratories included the most modern equipment for research, testing, and development work, because it was believed that such facilities would yield the best results in the betterment of the present types of pulps and the production of new ones. Plans for the new building were rapidly drawn up, and construction of the laboratories begun in June of last year.

## Rainier Started Production in 1927

The history of the Rainier Company dates back to 1926, for in that year the building of the present plant was started. Operations were commenced early in

1927 on bleached sulphite of the paper-pulp type. Mr. D. B. Davies came west from Wisconsin where he had had a number of years of valuable experience in the production of paper and wood-pulps for the regular and specialty uses. His wide and long experience in the sulphite industry has been of great value to Rainier in all of its endeavors. The quality of the Rainier Company's bleached sulphite soon made a reputation for it in the industry; and certain refinements in operation and increase in mill capacity were eventually thought justified and carried out.

In 1929 the Rainier Company undertook considerable experimental work for the purpose of determining the suitability of West Coast sulphite for rayon and cellophane industries. The promising results of this pioneering work led to the decision of the company to enter this field. This new product of the Rainier Company, known under the brand name of "Rayonier," soon became well known for its high quality; and the demand for it grew so rapidly that the entire production of the mill was turned to this commodity. The capacity of the mill was increased considerably, but in a few years the demand for "Rayonier" exceeded the supply.

In 1933 a large percentage of the output of another mill, the Olympic Forest Products Company of Port Angeles, Washington, was converted to "Rayonier" production to keep pace with the demand. Development and production of "Rayonier" at this mill was carried out under the direction of the Rainier Company. Again in the following year still another mill was called for further ton-

nage of "Rayonier," in this instance the Grays Harbor Pulp & Paper Company at Hoquiam, Washington.

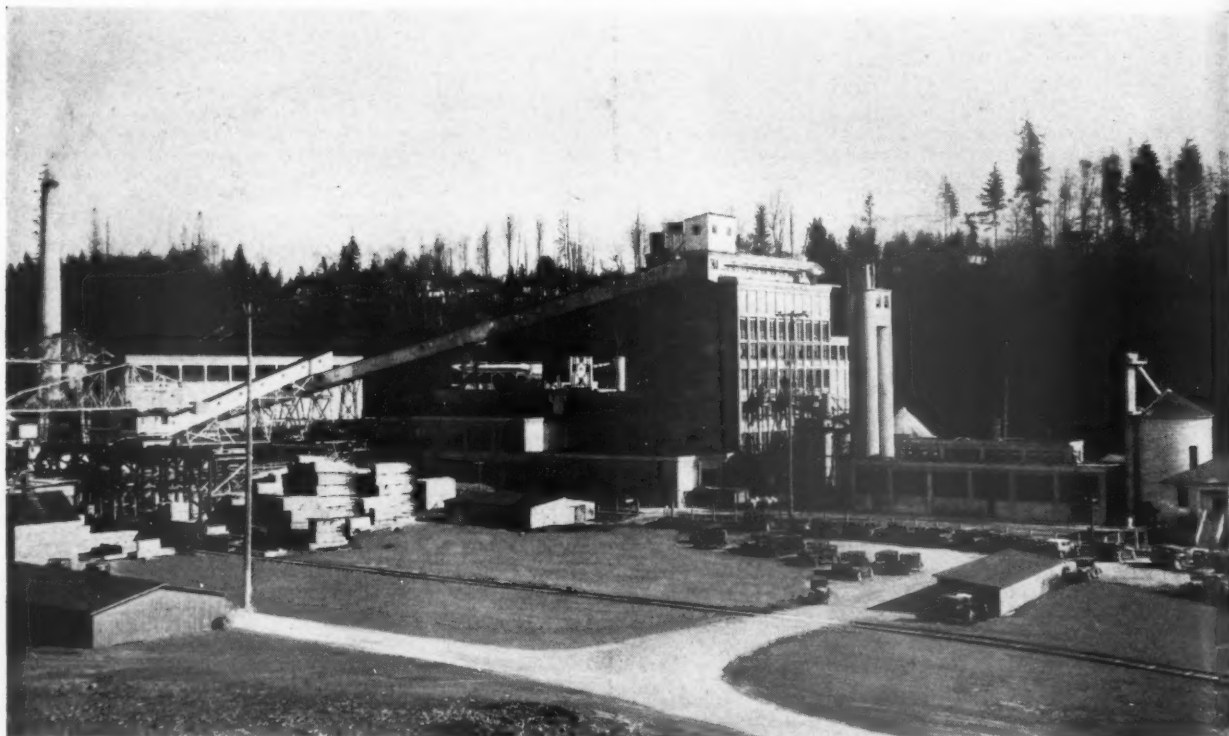
The management of the Rainier Pulp & Paper Company has ever been alert to take advantage of the opportunities which have developed in recent years for the converting of wood cellulose into a wide variety of commercial products.

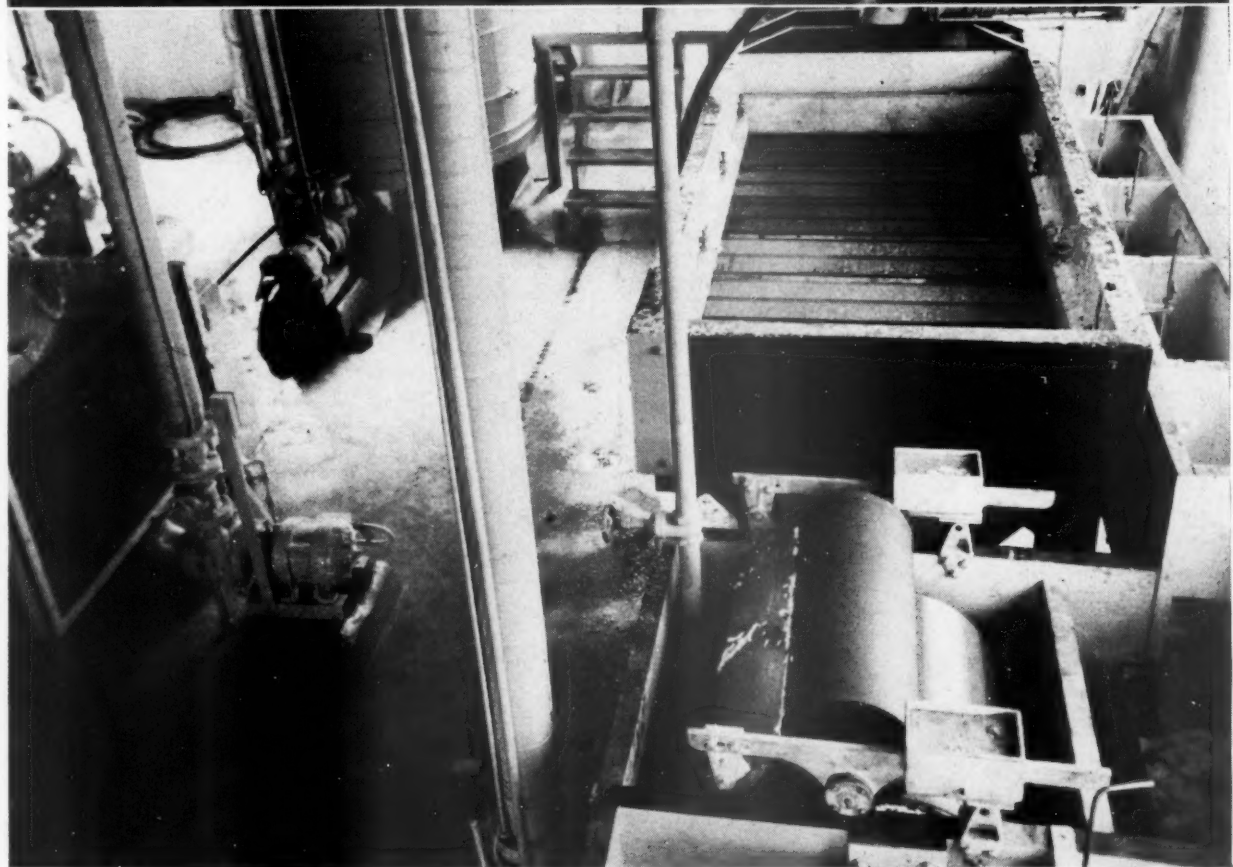
## Research Not New to Rainier

Rainier's management from the beginning of the organization has been convinced of the commercial value of intelligent research aimed to improve the company's products, thereby assisting Rainier's customers in producing better quality products of their own. This was first evident when Rainier developed its pulp to a point where it was highly satis-

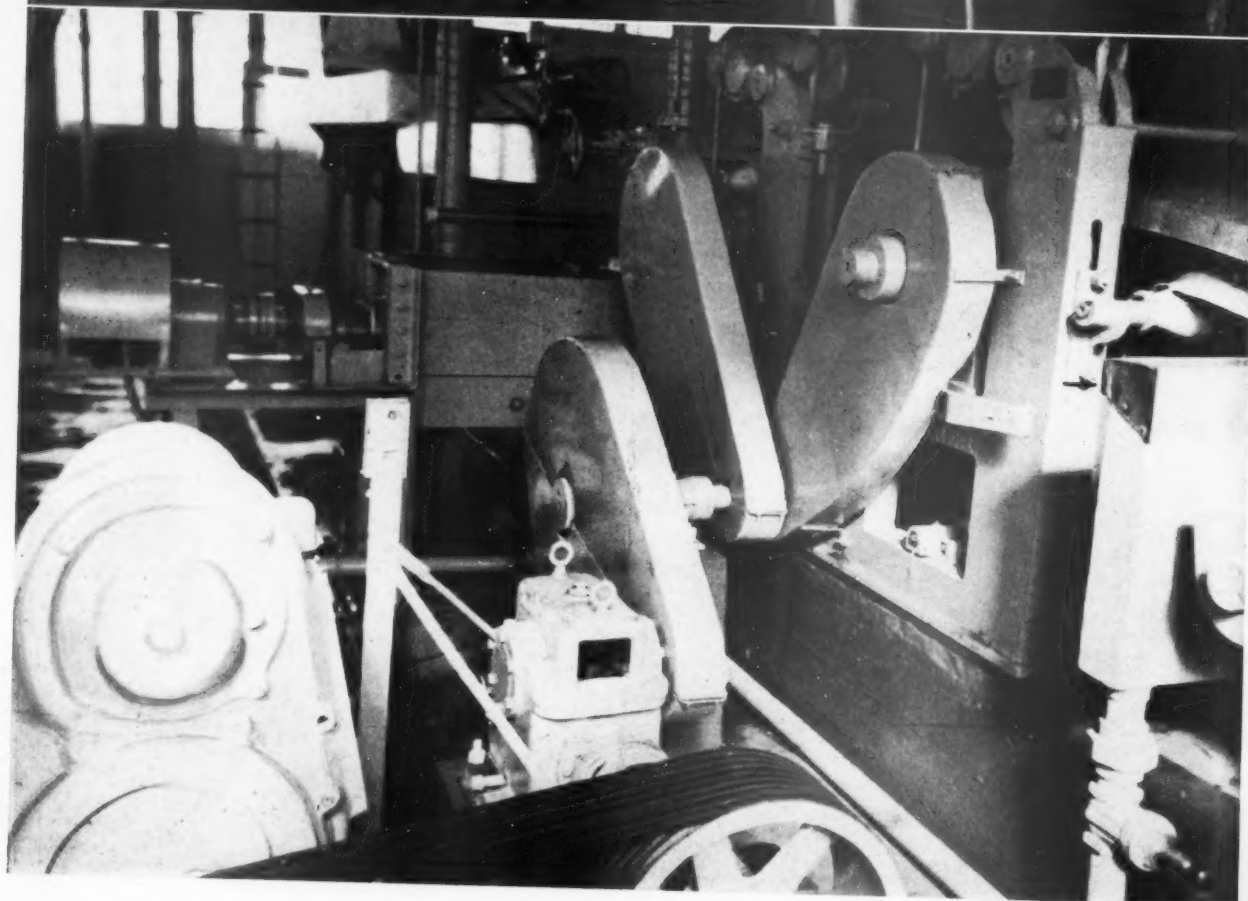
At the right are two views of the semi-plant pulp making laboratory showing the screens and the decker. Pulp may be produced in either small or large quantities depending upon the requirements of the experimental work in progress.

The Rainier Pulp & Paper Company's bleached sulphite pulp mill at Shelton, Washington. The new research and experimental laboratory is to the right and back of the office building, just outside the photograph.

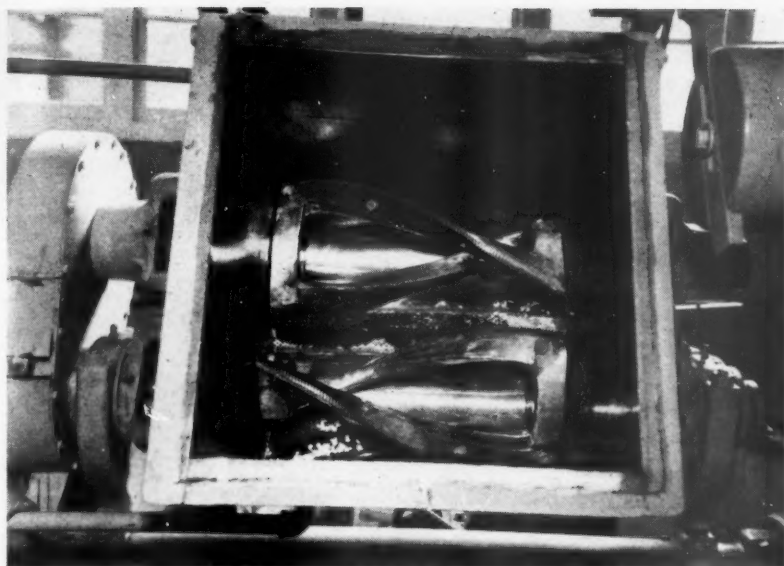












On the opposite page the photographs show the semi-plant pulp making laboratory. At the left of the upper picture is the dryer section of the pulp sheet making machine. The lower picture shows the drive of same machine illustrating the flexibility of control.

On this page at the left is the stainless steel pulp shredder in the viscose rayon laboratory. In the center below is the reeling machine which re-winds the rayon filaments after they have been spun preparatory to further treatment. The bottom photograph shows one of the pulp testing laboratories.

factory for making rayon, and transparent film such as Cellophane, Sylphwrap, etc., the first successful attempt to employ Pacific Coast woodpulp for these purposes.

The study of waste sulphite liquor and its principal component, lignin, has been one of the interests of Rainier research. It has resulted within the past year in the successful reduction of waste sulphite liquor to a material satisfactory for road surfacing. The new material, known as "Raylig," has been scientifically tested on roads adjacent to Shelton, and has aroused widespread interest, resulting in the sale this spring of a large quantity of this material to the highway department of the State of New Jersey and to several other large potential users.

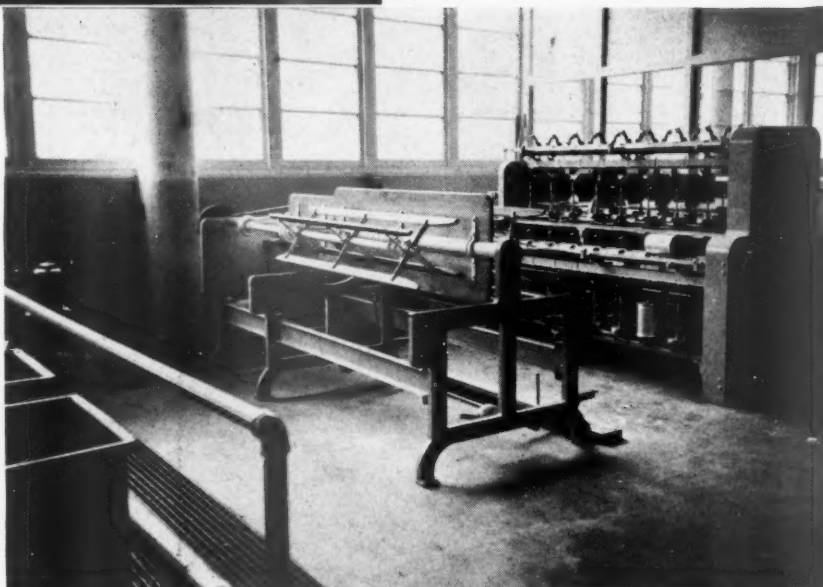
With the new laboratory containing the finest equipment obtainable and a personnel of trained and experienced men, the Rainier Pulp & Paper Company is now in a position to render greater service to its customers through closer control of production processes and also through studies aimed to further improve pulp quality.

#### The Future of Wood Cellulose

The fields in which wood cellulose is used as a raw material have been widely extended in recent years. Today promising markets challenge the ingenuity of the cellulose chemists to make it possible for wood cellulose to enter fields where cellulose from other sources is used exclusively. Great progress has been made, but much more remains to be learned about the chemistry of wood. Chemists generally agree that the utilization of wood may be tremendously expanded in the future through research on its major components, cellulose and lignin.

It was but a comparatively short time ago that woodpulp was of marginal value in making rayon, but so great has been the progress in improvement of wood cellulose that today 90 per cent of the cellulosic raw material of the viscose process is bleached sulphite woodpulp. Incidentally, the viscose is the largest of the rayon manufacturing processes and produces 77 per cent of all the rayon that is manufactured.

Production of rayon is increasing year by year, not only in the United States, which leads the world, but also in Japan,



which is second, and in the other nations of the world. United States rayon production in 1935 increased 25 per cent over that of 1934. World output of rayon in 1935 was more than double the production of 1929.

"Rayonier" pulp is employed in making both rayon and transparent film, as well as in the manufacture of numerous other products such as vulcanized fiber, nitrocellulose, special papers, etc.

Wood cellulose is also used in the nitrocellulose lacquer, plastics, and film industries. Chemists are working steadily toward the use of woodpulp in the making of cellulose acetate, an outlet for cellulose at present obtained from cotton linters.

Rayon made by the cellulose acetate process has qualities desirable, both from the manufacturing and consuming viewpoints, not found in the rayons produced by other processes. Likewise, cellulose acetate plastics have inherent qualities which make them readily saleable in a variety of products. The center sheet of safety glass is one outstanding example of the use of cellulose acetate plastic material, and has supplanted nitrocellulose in part in this field. The expansion in the production of cellulose acetate plastics has been phenomenal; 1935 production increased 119 per cent over that of 1934.

#### Departments of the New Laboratory

The Rainier Pulp & Paper Company's testing and experimental laboratory covers a ground area of about 7800 square feet. It is built of concrete with all four sides entirely in windows to permit a maximum of light. The entire laboratory is air conditioned, for it is necessary that the temperature and humidity be controlled or altered as desired for exact testing work. In the interests of the greatest possible flexibility of the laboratory facilities the interior partitions are of the movable type. The laboratory is almost entirely self-contained, and to this end small digesters have been included in the equipment, so that pulp can be produced under carefully controlled conditions, independently of the main plant.

Much of the equipment in the building is of non-corrosive material, the type of material best suited to particular purposes having been chosen. Numerous control instruments of latest design have been added to the laboratory equipment to insure the best results from the several operations.

Within the Research Laboratory building are facilities for the manufacture of pulps under a great variety of conditions, and with careful control. Another division is concerned with the experimental manufacture of rayon yarn

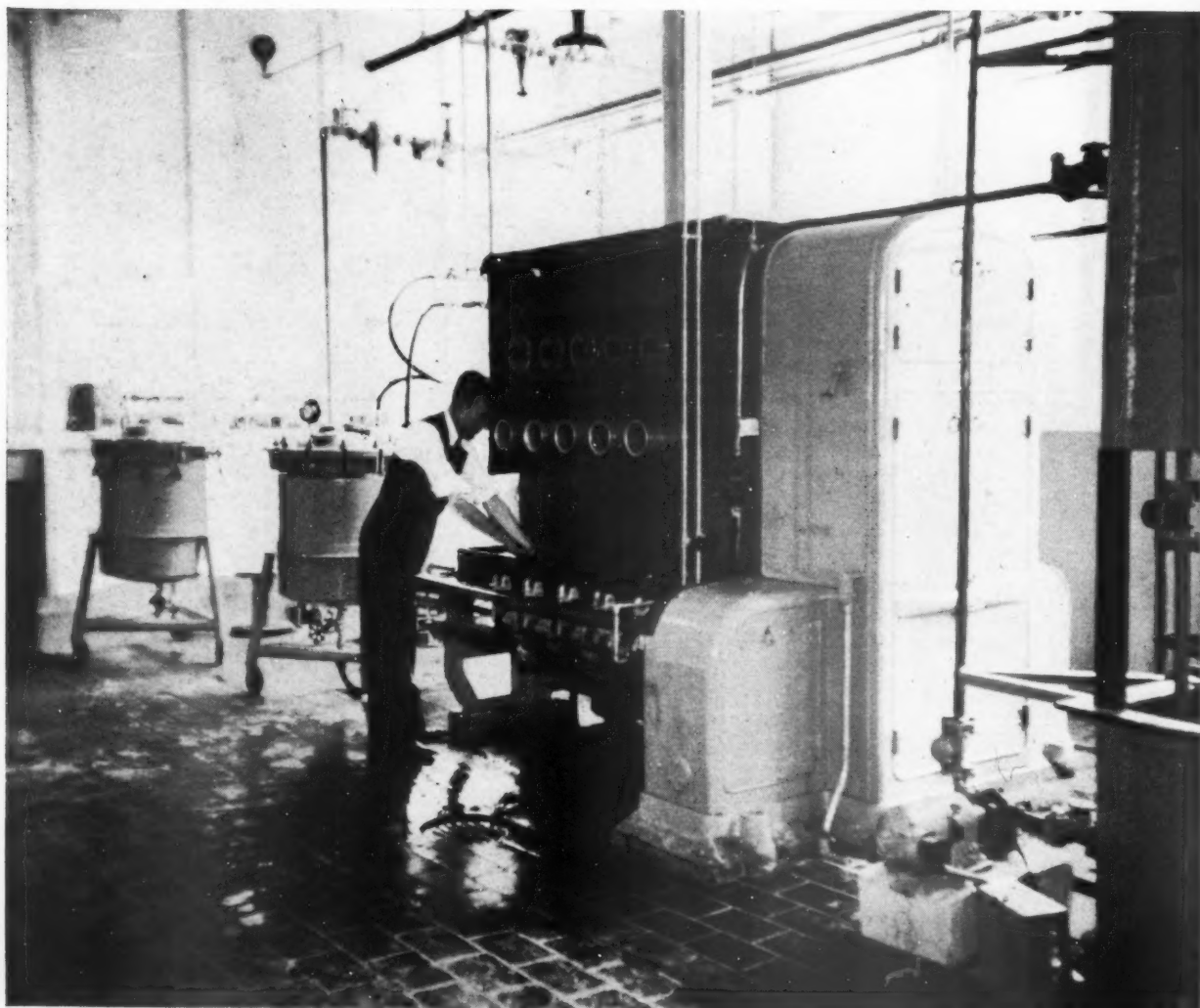
from cellulosic sources. Here again the keynote is upon flexibility and control of the various steps in the process from start to finish. Along with the manufacture of rayon the Rainier Company has included the latest equipment and best methods for testing. One division of the laboratory is devoted to the development of cellulosic products for a large number of purposes. Here also is provided testing equipment for these products.

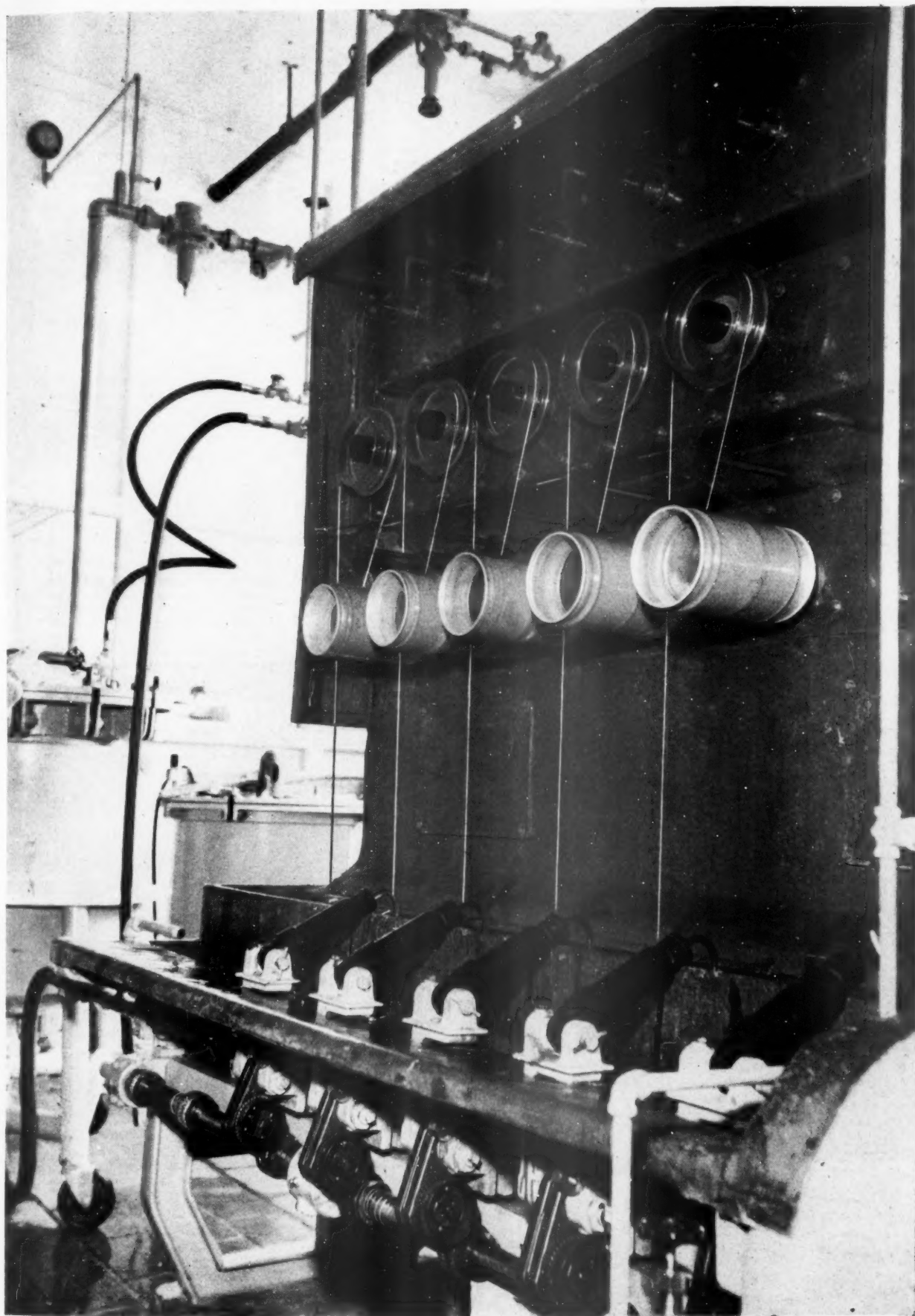
#### Semi-Plant Pulp Laboratory

The equipment for this laboratory was designed and set up so that pulp could be produced in either small or large quantities as necessity demands. The manufacture of smaller quantities of pulp is intended for initial stages of

At the right a close-up of the viscose rayon spinning machine in operation showing the filaments being drawn from the coagulating bath and wound preparatory to further processing. The filaments have been enlarged to illustrate the method of spinning.

The standard size viscose rayon spinning machine in the new Rainier research and experimental laboratory.









work, but larger facilities are at hand for the production on semi-plant scale. The facilities for screening, washing, bleaching, etc., allow the greatest flexibility of operation and control.

#### Viscose Laboratory

The equipment for the manufacture of viscose is also set up so that either large or small quantities of it can be produced at will, and under a variety of conditions under constant control.

The spinning machine, coagulating baths, washing, and finishing operations for the manufacture of rayon and for its purification can be held within close limits, and conditions can be altered at the will of the operators. It has been the Rainier Company's object to provide the optimum flexibility and the best control possible so that the greatest value can be obtained from research work along all of these lines.

Above, a bale of "Rayonier" from which the products below are manufactured by customers of the Rainier Pulp & Paper Company. On a bath towel of rayon are a skein of rayon yarn, staple fibre, and a piece of transparent velvet. These are but a few of the many products made from "Rayonier".





# The CHLORINATION of WOOD PULP

By RALPH B. HANSEN<sup>1</sup>

The advent of new and different ideas and methods resulting from industrial research and experience brings with them many new and sometimes adverse opinions and decisions. These contrary ideas are sometimes well founded being brought about by differences in findings or differences in the interpretations of those findings. No matter how they come about, if they are conscientiously made, there is justification for their existence, yet we must not lose sight of the fact that they have a very deterrent effect upon unified progress. With these ideas in mind this paper is offered with a hope that it will help clarify some of the oft repeated questions regarding the old, yet relatively new, idea of purifying cellulose with chlorine.

It seems to make but little difference whether it is at a round table conference of mill executives or with a couple of the boys sitting down behind the chlorinators, the same old discussion comes up. The question is:

1. Is chlorination, oxidation and bleaching one and the same thing?
2. Is hypochlorous acid always an oxidizing agent?
3. Is hypochlorous acid formed when an aqueous suspension of unbleached pulp is treated with chlorine?
4. Does hypochlorous acid always break down to give hydrochloric acid and oxygen or might it break down to give chlorine and water?
5. Is the treatment of a bleached or nearly bleached pulp with chlorine in the presence of water one of oxidation or chlorination?
6. What is meant by acid bleaching?

## Chemistry of Bleaching

Many well-meaning "authorities" tell us that bleaching, oxidation and chlorination are synonymous terms and in our perplexity we turn to Webster's dictionary only to find that bleaching is any kind of a whitening effect. Therefore, we might be constrained to think that Johnny's action of washing behind his ears is similar in theory to the bleaching of wood pulp. This cannot be true, however, therefore, we must first define bleaching. Bleaching may be defined as the whitening effect brought about by a process of oxidation due to chemical treatment. So far as the papermaker is concerned this is true. Therefore, it can very easily be shown that chlorination and bleaching are not synonymous terms.

Any substance which readily gives up nascent oxygen is an oxidizing agent, when it gives up that oxygen. If this same substance under different conditions breaks down to give something other than nascent oxygen it would not in this case be an oxidizing agent. Such a substance is hypochlorous acid, which in the presence of a substance whose affinity for oxygen is greater than its affinity for chlorine acts as an oxidizing agent. However, if there is a substance present whose affinity for chlor-

## Technical Association of the Pulp and Paper Industry

122 East 42nd Street, New York, N. Y.

Longview, Washington.  
April 24, 1936.

Mr. Harlan Scott  
Editor

Pacific Pulp and Paper Industry  
71 Columbia Street  
Seattle, Washington

Dear Mr. Scott:

The April issue of the "Pacific Pulp and Paper Industry," with the published papers on bleaching which were so well presented at Olympia, has just come to hand. While the subject of bleaching is very thoroughly covered, particularly in the experimental sulphate studies, I am wondering if the fundamental principles of modern bleaching are presented with sufficient clarity.

Some four years ago the late Ralph Hansen read a paper on the principles of chlorination and bleaching in which these reactions were discussed very completely. The theories advanced have since been substantiated in actual practice.

Because these theories have stood the test of a certain length of time, I wish to suggest that you republish the paper mentioned so that those who are interested may compare the theories set forth at that time with those advanced at Olympia.

Thanking you for any consideration you may give this matter,

Very truly yours

WNK:m

W. N. KELLY

ine is greater than its affinity for oxygen, hypochlorous acid acts as a chlorinating agent, in such a case chlorine and water will be formed. Note the following reactions with chlorine and hypochlorous acid.

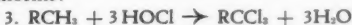
If there is a predominating affinity for oxygen:



If there is no affinity for oxygen or chlorine:



If there is a predominating affinity for chlorine:



Or if straight chlorine is used in (3) above:



Equation number (3) above does not usually take place as shown because what is commercially called hypochlorous acid is the product of the following reaction between chlorine and water.



If the product of equation number (5) is substituted for hypochlorous acid in equation number (3) we have as follows:



which is what actually takes place if unbleached pulp is treated with so-called "hypochlorous" acid.

Recalling some of our early chemistry we will remember that the reaction between chlorine and water is as given in equation number (5) above. We re-

member also that this reaction is reversible. By this is meant that the rate at which the two molecules on the right are transformed into the two on the left and vice versa is proportional to the chemical affinity which exists between the different molecules and to their molecular concentrations. This transformation is continued until an equilibrium is established. For any given reaction this equilibrium is constant and will remain so until interfered with by some external force. If such disturbance occurs the above reaction will proceed in whichever direction is necessary to restore this equilibrium. This is known as the law of molecular concentrations and may be written as follows:

$$7. K = \frac{[\text{Cl}_2] [\text{H}_2\text{O}]}{[\text{HOCl}] [\text{HCl}]}$$

In other words the product of the molecular concentrations of the substances formed divided by the product of interacting substances is always constant.

However, where chlorine is added to water containing a substantial amount of unbleached pulp stock the whole story is changed. Over 35 years ago Cross and Bevans studied the action of chlorine on wood and other vegetable fibers. In this work it was shown, and it has been verified since, that when a ligno-cellulose compound is treated with chlorine, lignin-chlorine is formed. See equation number (4) above. (The writer has indicated  $\text{RCH}_3$  as being a substance similar in reaction to lignin. Also that  $\text{RCCl}_3$  is a reaction product

<sup>1</sup>Presented at the spring meeting of the Pacific Section of TAPPI, Multnomah Hotel, Portland, Oregon, May 6th and 7th, 1932.

<sup>2</sup>The late Mr. Ralph Hansen was technical director of the Pulp Division, Weyerhaeuser Timber Company, Longview, Washington, at the time he presented this paper.

similar to lignin chloride.) It was further observed by these and later investigators that with the formation of lignin-chloride hydrochloride acid was simultaneously formed and further that the chlorine going to form hydrochloric acid was equal in amount to that combining with the lignin. This action continues just as long as there is any lignin left with which the chlorine may react. In other words, let it be emphasized that as long as lignin is present, oxidation does not take place during chlorination. This is true for two reasons, first, because of lignin's greater affinity for chlorine, and, second, because of the increased amounts of hydrochloric acid forcing reaction number (5) toward the left and, therefore, preventing the formation of hypochlorous acid. In other words, hypochlorous acid or the only oxidizing agent which could possibly be present must not be formed or must be removed. Not only that, but if commercial hypochlorous acid ( $\text{HOCl} + \text{HCl}$ ) were formed or was added from an external source the result, would be the same and the products of reaction would be the same. (Note that the products of reaction in equation number (4) and equation number (6) are identical except for water which may be forgotten.) In equation number (3) the reaction products are somewhat different but the results on cellulose are the same so far as the writer has been able to determine. From this it is plain to be seen that chlorination of unbleached pulp is in no sense an oxidation process.

However, as said before, if there is no substance present during this chlorination which has an affinity for chlorine greater than its affinity for nascent oxygen, oxidation will take place. Such is exactly what happens when a semi or nearly bleached pulp in aqueous suspension is treated with chlorine. In this case, hypochlorous acid is formed as in equation number (5) with its subsequent breaking down to yield oxygen as in equation number (1). This is purely oxidation.

The question, "What is meant by acid bleaching?" should be answered by saying that acid bleaching is oxidation while in an acid condition. Therefore, chlorination may or may not be acid bleaching. Chlorination in the presence of lignin is not acid bleaching, because no oxidation takes place until after all lignin has been removed. Chlorination under conditions where  $\text{HOCl}$  breaks down to give hydrochloric acid and oxygen is oxidation.

#### Chlorination Practice

So much for the theory or chemistry of chlorination. Let us now turn to the practical commercial application of some of these principles. The use of chlorine on an industrial scale for the removal of lignin from ligno-cellulose compounds is now a successful reality, being used in several of the largest bleaching plants in the industry. From the chemistry of these reactions may readily be seen the many advantages which the chlorination method has over the oxidation method for the purification of cellulose. These many advantages have long been known but before they could be used commercially, it was necessary to wait the development along mechanical lines to the end of obtaining equipment which would give almost perfect agitation and resist the ultimate acid and alkaline corrosion conditions. Such equipment has now been developed and is installed and

working very satisfactorily in several modern bleaching plants.

There are two distinctly different types of chlorinating equipment being used or recommended for use today, the one being a batch system and the other being a continuous system. The batch system is the better of the two, due largely to the lack of uniformity of treatment of stock passing through present day continuous systems. To date it has not been possible to absorb the requisite amount of chlorine in a stock-water suspension and have a homogeneous mixture when passing through a continuous chlorinator once. If the method of recirculation is used, with a continuous intake and a continuous outlet of stock, lack of uniform treatment is obvious. Some of the stock passes through without recirculation and some recirculates an indefinite number of times. It must be remembered that uniformity of treatment in this phase is essential because of not only the harm being done by lack of uniformity in this phase but also because of harm done by treating a nonuniform stock in the next phase.

#### Continuous vs. Batch Systems

There are other disadvantages evident in the continuous system, among them being:

1. The impossibility of controlling the amount of stock passing through per unit of time, due to variation in power, consistency, demands, etc.
2. The impossibility of controlling the amount of chlorine passing through per unit of time, due to variations in temperature and pressures of chlorine container, corrosion of expansion valves, dirt in chlorine pipe lines, freezing effect if liquid chlorine is used, etc.
3. Continuous adjustments of chlorine feed necessary to take care of continuous variations in bleachability of incoming stock.

Continuous chlorination systems may come but they are a long way off at the present writing.

With the batch system the laboratory or scientific method of control is self-evident. Contrasted with the continuous systems the following advantages are clearly seen:

1. A very definite amount of chlorine may be measured or weighed into a very definite amount of stock.
2. Consistencies can be controlled.
3. Yields can be measured.
4. Production can be measured.
5. Shrinkages can be measured.
6. High rates of agitation make possible high rates of chlorine absorption without polluting the surrounding atmosphere by escaping chlorine gas.
7. Varying amounts of chlorine can be carefully measured and added as the bleachability of the stock varies. By so doing the stock entering the second phase may be made exactly uniform in bleachability.

Whenever all of these factors can be accomplished and controlled with a continuous chlorinator, then and only then will the continuous system have a fighting chance with the batch system.

#### Chlorination vs. Oxidation Methods

It matters not what kind of chlorination system is used, as long as it is conducive to good control and permanency, it has a large number of very marked advantages over the oxidation method of purifying cellulose. Some of the advantages are as follows:

1. A maximum amount of non-cellulose constituents are removed with very little or no oxidation. This is due to

removing all the lignin as lignin chloride in an acid condition but not an oxidizing condition.

2. It is further responsible for increased quality in that it adds another phase to the purification problem, after which a washing is necessary, thereby removing loosened and soluble coloring matter which would, if the work were all done in one phase, have to be bleached white with oxygen.

3. The chlorination method of removing impurities is a very decided economy over removing these impurities by oxidation. There is at least a 20 to 30 per cent saving in chlorine by the use of gaseous chlorine in the first phase over that necessary if an alkaline bleach liquor were used throughout the bleaching process. This is true in a very modern bleaching plant where approximately 75 per cent of the necessary available chlorine is added as gaseous chlorine in the first phase of a three phase system, treating unbleached sulphite pulp in the cold and at about 3.5 per cent consistency. In the second phase about 24 per cent of the necessary available chlorine is added as calcium hypochlorite to the stock at about 16 per cent consistency and about 75 deg. F. The remaining 1 per cent of the necessary chlorine (about 0.05 per cent, on the weight of the stock) is added as gaseous chlorine in a third phase at similar consistencies and temperatures to those used in the first phase. By this system a maximum amount of the coloring matter is removed by chlorination and a minimum amount by oxidation. Therefore, as pointed out in previous paragraphs, a minimum amount of oxidation of cellulose occurs and a maximum retention of physical characteristics is evident.

4. By virtue of a minimum amount of oxidation of cellulose, greater yields are characteristic of the chlorination system. In the mill just spoken of above, the shrinkage of stock through the bleach plant is 4 to 6 per cent less than where a hypochlorite bleach is used throughout the process.

5. As mentioned before, the system described above has much more flexibility and is, therefore, much easier to handle, thereby making for greater uniformity, the great cry of the paper manufacturer today.

#### Summary

1. Hypochlorous acid is an oxidizing agent only when in the presence of a substance having greater affinity for oxygen than for chlorine.

2. Hypochlorous acid is a chlorinating agent in the presence of lignin.

3. Reaction products of treating lignin with either chlorine or commercial hypochlorous acid are the same.

4. Chlorine as such is not a bleaching agent and does not form a bleaching agent with water while in the presence of an organic substance similar to lignin.

5. Chlorine does form an oxidizing agent and, thereby, causes oxidation of a purified or nearly purified cellulose if no lignin or similar material is present.

6. Acid bleaching is oxidation while in an acid condition.

7. The removal of lignin from wood pulp by the use of chlorine is responsible for better quality, greater yield, and better uniformity.

8. The batch system of Chlorination is superior to the continuous system from the point of ease of control and uniformity of product. It makes possible laboratory precision of processing.

# MERCHANTS and MANUFACTURERS MEET AT DEL MONTE

## MAY 14 to 16th

### Elect Walter W. Huelat President

Another Pacific States Paper Trade Association convention passed into history when paper jobbers and mill men from up and down the coast gathered at Del Monte on the 14th, 15th and 16th of this month for their nineteenth annual meeting. The attendance was up to the best of the sessions ever held before and interest of the delegates appeared keener than usual in the many problems brought up for discussion. It was a serious meeting and the mill men and jobbers went to the meeting to work first and to play second.

There was launched at this meeting a constructive program which, if finally adopted, will greatly increase the membership of the association and broaden its activity and influence. This plan is to reorganize the organization's structure so as to make it conform to that of the National Paper Trade Association and to reach out and take in as members all of the paper jobbers who belong to their local associations. Thus a membership in his local conference would automatically give a paper jobber membership in the Pacific States body and his membership in this latter organization would make him automatically a member of the national body.

No definite action was taken on this program, but it is to be submitted to the members at large in the immediate future. Of course there will be costs attached to this plan and dues of the members may be affected, but leaders of the work hope it will be adopted so that the entire trade will be unified into a single body and that each member of the industry will benefit directly by the association's activity and also will be bearing his share of the cost.

If adopted, the fiscal year of the Pacific States body will be changed to start in February, which is when the fiscal year of the N. P. T. A. starts.

Presiding at this meeting was Mr. Walter W. Huelat, manager of the Los Angeles office of Blake, Moffitt & Towne and in his opening remarks he declared that the year just closing had brought about events which pointed with forcible symptoms to the wisdom of all embracing the benefits and facilities of the paper trade association.

"We find ourselves running our industry and our business without the aid of or interference of codes—or what have you—and it seems pertinent here to ask that who, under the blue canopy of heaven, should be better qualified to operate a business than those in it," Mr. Huelat said.

"After this convention, let's go home and put into operation, in our relations with our associates the principles, standards and Golden Rule maxims that real trade associations stand for, instead of each turning to tactics sometimes prevalent in the past. Let's make this a convention that will have blazed a trail!"



WALTER W. HUELAT  
President  
Pacific States Paper Trade Assn.

Among the papers presented at the meeting were some which stand out as masterpieces in their thought and helpfulness and many of these will be reproduced in future issues of PACIFIC PULP & PAPER INDUSTRY. Two outstanding papers were by E. A. Breyman, Zellerbach Paper Co., San Francisco, one on "Unemployment Insurance Acts" and the other on "Taxation Problems and Their Direct Relation to Operating Expense."

Mr. Walter W. Huelat, a vice-president of the association, was drafted to sit in the presiding officer's chair as a result, he said, of unusual circumstances. The president, Mr. Carl H. Fricke of Taverner & Fricke, Los Angeles, is in Europe and could not be at Del Monte to preside and Mr. Huelat said he was very happy to boast that any member of the Los Angeles trading area could afford a trip to Europe. Even Mr. Huelat, who was later to be elected to the presidency, described himself as a junior member.

Mr. Huelat said the convention missed Mr. William Howarth, the veteran head of Everett Pulp & Paper Co., who has been a regular attendant at the Del Monte meetings for years, but whose health prevented the trip this year. He also paid tribute to Mr. I. Zellerbach, head of the Crown-Zellerbach Corporation, who has been at every meeting of the association and who was there this year as usual. The chair also commented on the absence of Mr. M. M. Baruh, a member of the manufacturers golf tournament for many years and who was kept at home this spring as he is

recovering from a serious illness. Telegrams expressing the convention's regret at their absence were sent to Mr. Howarth and Mr. Baruh.

Two other "regulars" were missing. They were Mr. J. L. Murray, sales manager of the Everett Pulp & Paper Co., who underwent a serious operation in Seattle a few weeks previously, and Mr. J. Y. Baruh of the Crown-Zellerbach Corporation of Los Angeles, also ill.

The only two eastern paper mill men present were Mr. Donald S. Leslie and Mr. A. Ellis Frampton of the Hammermill Paper Co. of Erie, Pa.

There were two addresses scheduled for the merchants and manufacturers meeting, one by Mr. Leslie, who is vice-president of Hammermill, and the other by Mr. Otto W. Mielke, San Francisco, general manager of Blake, Moffitt & Towne.

Mr. Leslie said he thought this coast gathering was the most ideal paper meeting ever planned, for it found the merchants and manufacturers working closely together.

"Paper merchants and paper manufacturers are in the same boat on the same rough seas," Mr. Leslie said, "There is optimism in the east and yet the book paper manufacturers are doubtful if the present prices will hold. In the Chicago territory our volume has improved materially, with the sales climbing from less than 60 per cent of capacity up to 80 per cent in the past year."

Mr. Leslie said the tax problem was one of the serious problems facing the paper industry and remarked that in 1935 the Hammermill company paid out approximately \$178,000 in taxes. He declared the paper merchants of the Pacific Coast had for many years set an example to the rest of the country for fair play and he closed with the hope that the west's splendid standards would be maintained.

Mr. Mielke's subject was "The Degeneration of the Paper Merchandising Business," and he deplored the greatly increasing number of firms entering the paper jobbing or wholesaling business in California, declaring there were 490 companies or individuals in the state engaged in this activity, where there is enough business for only between forty and fifty legitimate houses.

Greater cooperation between merchants and the mills was urged by various other speakers, including Harold Zellerbach, R. A. McDonald, Harry Bean and others.

#### Walter Huelat Elected President

Walter W. Huelat, manager of the Los Angeles division of Blake, Moffitt & Towne, was elected president of the Pacific States Paper Trade Association at Del Monte this month and he will have the rather unusual honor of presiding at two of the conventions—this meeting and the 1937 gathering.

Ordinarily the executive vice-president is elected to the presidency each year but at this convention neither the presi-



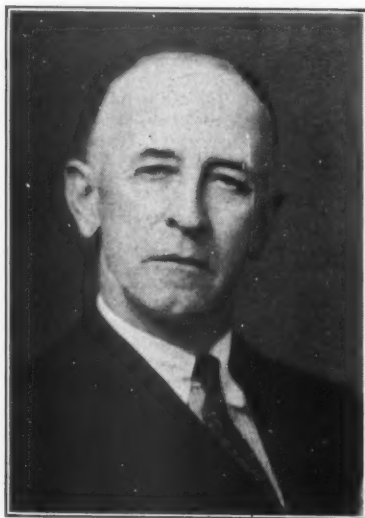
dent, Mr. Carl H. Fricke, Los Angeles—nor the executive vice-president, Mr. G. O. Rogers, Spokane, was in attendance, so Mr. Huelat was drafted to handle the gavel and he did the job so well that they elected him to the post for the coming year. Last year's convention elected Mr. Huelat to a vice-presidency, but he was not directly in line for the executive office.

For executive vice-president the 1936 meeting chose Victor E. Hecht, vice-president of the Zellerbach Paper Co., San Francisco and now Mr. Hecht is in line for the presidency at the 1937 meeting if—as he says—he behaves himself and does the work assigned to him.

New vice-presidents elected this year are: Mr. Roy E. Banks, Long Beach Paper & Notion Co., Long Beach; Mr. F. E. Jefferies, Tacoma Paper & Stationery Co., Tacoma; Mr. J. E. Jones, Western Newspaper Union, Salt Lake City; Mr. J. W. P. McFall, J. W. P. McFall Co., Portland; Mr. Albion B. Rogers, Spokane Paper & Stationery Co., Spokane.

This was the first convention Mr. McFall ever attended, although he has belonged to the paper trade association ever since it was organized nineteen years ago. Mr. McFall says he has been too busy attending to his business and to his shooting to come to the meetings, but now that he has attended one, he'll never miss another. Mr. Jefferies was not at Del Monte, as he but recently returned from a Honolulu trip and couldn't spare the time. This was Mr. Albion Rogers' first Del Monte convention in about ten years. He is a brother of Mr. Guy Rogers the retiring executive vice-president. Mr. Jones of Salt Lake has been a regular at the meetings recently but was not there this year. Mr. H. Arthur Dunn, San Francisco, was reelected secretary.

One person who has been at every Del Monte paper meeting and who was there and in action this year is Miss Hildegard Wahl, efficient assistant to the secretary. Miss Wahl has been associated with the paper trade association ever since September, 1919, and has seen to the mechanics of the meetings and helped make them run smoothly.



O. W. MIELKE  
Presided at the Golf Dinner

### Necrology

Resolutions of sympathy were passed by the Pacific States Paper Trade Association convention for five members or former members who have died within the past year.

The five were: Chriss A. Bell, Portland, Ore., secretary of the Portland Paper Trade Conference; James T. Igstadter, San Francisco, Zellerbach Paper Co.; Louis J. Marymont, San Jose, Zellerbach Paper Co.; James G. Ramsey, Everett Pulp & Paper Co.; William Guthrie, Guthrie Paper Co., Seattle.

Committees named at the meeting were:

**FINANCE**—I. Zellerbach, chairman; Charles H. Beckwith, Albion B. Rogers, Wm. E. Taverner and Arthur W. Towne.

**NECROLOGY**—Frank C. Stratford, chairman; R. E. Le Grant and J. W. Murphy.

**TRAFFIC**—R. R. Howry, chairman; L. A. Dietrich and G. J. Vollmer.

**NOMINATING**—H. D. Bean, chairman; W. D. McWaters, Mason B. Olmsted, A. B. Rogers and J. W. Thompson.

Those in attendance were:

### MERCHANTS

**FRESNO, CALIF.**—A. R. Kuhn, Zellerbach Paper Co.

**LONG BEACH, CALIF.**—R. E. Banks and W. E. Fricke, Long Beach Paper & Notion Co.

**LOS ANGELES**—W. W. Huelat and R. R. Whiteman, Blake, Moffitt & Towne; Lew Gronich, General Paper Co.; W. E. Taverner and R. E. Le Grant, Taverner & Fricke; M. B. Olmsted, Zellerbach Paper Co.

**OAKLAND**—J. C. Ady, Zellerbach Paper Co.

**PORTLAND**—C. L. Shorno, Blake, Moffitt & Towne; J. W. Murphy, Carter, Rice & Co.; J. W. P. McFall, J. W. P. McFall Co.; W. D. McWaters, Zellerbach Paper Co.

**SAN FRANCISCO**—O. W. Mielke and Arthur W. Towne, Blake, Moffitt & Towne; C. H. Beckwith, Carter, Rice & Co., Corp.; H. D. Bean, General Paper Co.; E. A. Breyman, T. J. Finerty, Victor E. Hecht, F. C. Stratford, H. L. Zellerbach and I. Zellerbach, Zellerbach, Zellerbach Paper Co.

**SEATTLE**—J. W. Thompson, Blake, Moffitt & Towne; E. E. Embree, Carter, Rice & Co., Corp.; A. W. Akers, Zellerbach Paper Co.

**SPOKANE**—Albion B. Rogers, Spokane Paper & Stationery Co.

Secretaries: W. B. Reynolds, Los Angeles; H. Arthur Dunn and E. L. O'Neil, San Francisco and W. P. Uhlman, Seattle.

### MANUFACTURERS

Adhesive Products Co., San Francisco—Paul W. Shattuck; A. P. W. Paper Co., San Francisco—C. J. Allair; American Writing Paper Co., San Francisco—W. J. McCormick; Beckett Paper Co., Los Angeles—J. B. Jones; Bloomer Bros. Sales Corp., San Francisco—J. R. Townsend; Boxboard Products, Inc., San Francisco—R. J. Gruenberg; N. L. Brinker, Los Angeles; Brown Company, San Francisco—Earl Van Pool; Martin Cantine Co., San Francisco—E. B. Skinner; Continental Paper & Bag Co., Los Angeles—Frank N. Gladden; Capital Envelope Co., Los Angeles—G. L. McNamara.

Crown-Willamette Paper Co., San Francisco—G. J. Ticoulat, Portland—F. N. Youngman; Cupples Co., Los Angeles—Charles Spies; California Fruit Wrapping Mills, Pomona—F. O. Fernstrom; Dill & Collins, Inc., San Fran-



VICTOR E. HECHT  
Executive Vice-President  
Pacific States Paper Trade Assn.

cisco—Andrew H. Cochran; Carpenter Envelope Co., Los Angeles—Kenneth C. Holland; Everett Pulp & Paper Co., Everett—W. J. Pilz, San Francisco—R. A. Gates; Graham Paper Co., San Francisco—C. E. Swick, Los Angeles—F. R. Philbrook; Hammermill Paper Co., Erie, Pa.—D. S. Leslie and A. Ellis Framp-ton; Inland Empire Paper Co., Mill-wood, Wash.—W. A. Brazeau, Los Angeles—S. R. Whiting; Grays Harbor Corporation, San Francisco—B. P. Jag-gard; Augustus Johnson, San Francisco; Johnson-Locke Mercantile Co., San Fran-cisco—Charles Merchant, Kimberley-Clark Co., Los Angeles—C. Francis Jenkins; Geo. L. Monte & Son, San Francisco—V. N. Savale.

J. E. Nail, San Francisco; Nashua Gummed & Coated Paper Co., San Fran-cisco—James F. Nields; Northern Paper Mills, Los Angeles—Wm. Heitman; Northern Paper Co., San Francisco—C. P. Sheldon; Oregon Pulp & Paper Co., Salem, Ore.—Nils G. Teren; Pacific Coast Envelope Co., San Francisco—Geo. R. Davis; Pacific Safety Paper Mills, Los Angeles—Jack Cote; The Pat-erson Parchment Co., San Francisco—W. J. Gray; Pioneer-Flintkote Co., Los Angeles—Arthur E. Carlson; Powell River Co., Ltd., San Francisco—R. H. Scanlon; Howard R. Ruweler, San Fran-cisco; Strathmore Paper Co., San Fran-cisco—T. C. Macormack; Towelsaver, Inc., Los Angeles—J. Perrin; Western Waxed Paper Co., Oakland—Andrew Christ, Jr., Los Angeles—G. C. Wieman; J. F. Wuenschel, Grays Harbor Corp., Hoquiam, Wash.—J. H. Smith, vice president and general manager, Hawley Pulp & Paper Co., Oregon City, Ore.—Max Oberdorfer, president and general manager, St. Helens Pulp & Paper Co., St. Helens, Ore.

### VISITORS

#### (Non Members)

**LOS ANGELES**—Sid Calof, Badger Paper Co.; K. G. Holland, Carpenter Paper Co.; S. Abrams, United States Paper Co.

**SAN FRANCISCO**—Wm. Rothschild, Atlas Paper Co.; Ed. Israel, California Wiping Materials Co.; Marcus Alter, Commercial Paper Co., O. C. Doane, Doane Paper Co.; R. J. Elkus, Elkus Paper Co.; S. L. Brilliant, Haas Bros.; J. F. Smith, vice-president in charge of sales, Great Western Electrochemical Co.



# SPIES WINS GOLF TOURNAMENT

A new name was added to the list of golfing greats of the Pacific Coast paper industry when Charles A. Spies of the Cupples Co., Los Angeles, won the eighteenth annual Pacific Coast Paper Manufacturers' Golf Tournament held at Del Monte in connection with the paper trade association convention. Mr. Spies stepped into the niche held for two years by Chris Allair, A. P. W. Paper Co., San Francisco, twice title holder, but this year considerably down the list.

The annual golf dinner was held on Saturday night of convention week at Del Monte and was presided over by O. W. Mielke, Blake, Moffitt & Towne, San Francisco.

## The Winners

Following are the winners of the convention tournament with the prizes won and the donors:

### Gentlemen's Tournament

**CHAMPIONSHIP FLIGHT**—Won by: Charles Spies, Donor Pacific States Paper Trade Association. Prize: Silver pitcher.

**CLASS A**—Winner: G. J. Ticoulat. Donor: Everett Pulp & Paper Co. Prize: Silver fruit bowl. Runner-up: W. E. Taverner. Donor: Graham Paper Co. Prize: Set of "Old-Fashion" Glasses.

**CLASS B**—Winner: W. G. Lambert. Donor: Western Waxed Paper Co. Prize: Silver dish. Runner-up: W. J. Gray. Donor: Crown Willamette Paper Co. Prize: Cocktail shaker.

**BEST NET FOR 18 HOLES**: Winner: Wm. Shattuck. Donor: American Writing Paper Co. Prize: Toilet kit. Runner-up: Earl Van Pool. Donor: Geo. La Monte & Son. Prize: Desk clock.

**APPROACH AND PUTTING CONTEST**—Winner: Jack Cote. Donor: Inland Empire Paper Co. Prize: Ice tray. Runner-up: F. C. Stratford. Donor: Kimberly-Clark Co. Prize: Silver bowl.

**PUTTING CONTEST**—Winner: W. W. Huelat. Donor: Northwest Paper Co. Prize: Wine jug.

**BLIND BOGEY**—Winner: R. A. McDonald. Donor: Pacific Coast Envelope Co. Prize: Coffee set. Runner-up: C. J. Allair. Donor: Fitchburg Paper

Co. and Merrimac Paper Co., Inc. Prize: Brief case.

### Ladies Tournament

Winner: Mrs. T. McLaren. Donor: The Paterson Parchment Paper Co. Prize: Cake dish. Runner-up: Mrs. Frank Youngman. Donor: Grays Harbor Corporation. Prize: Compotes.

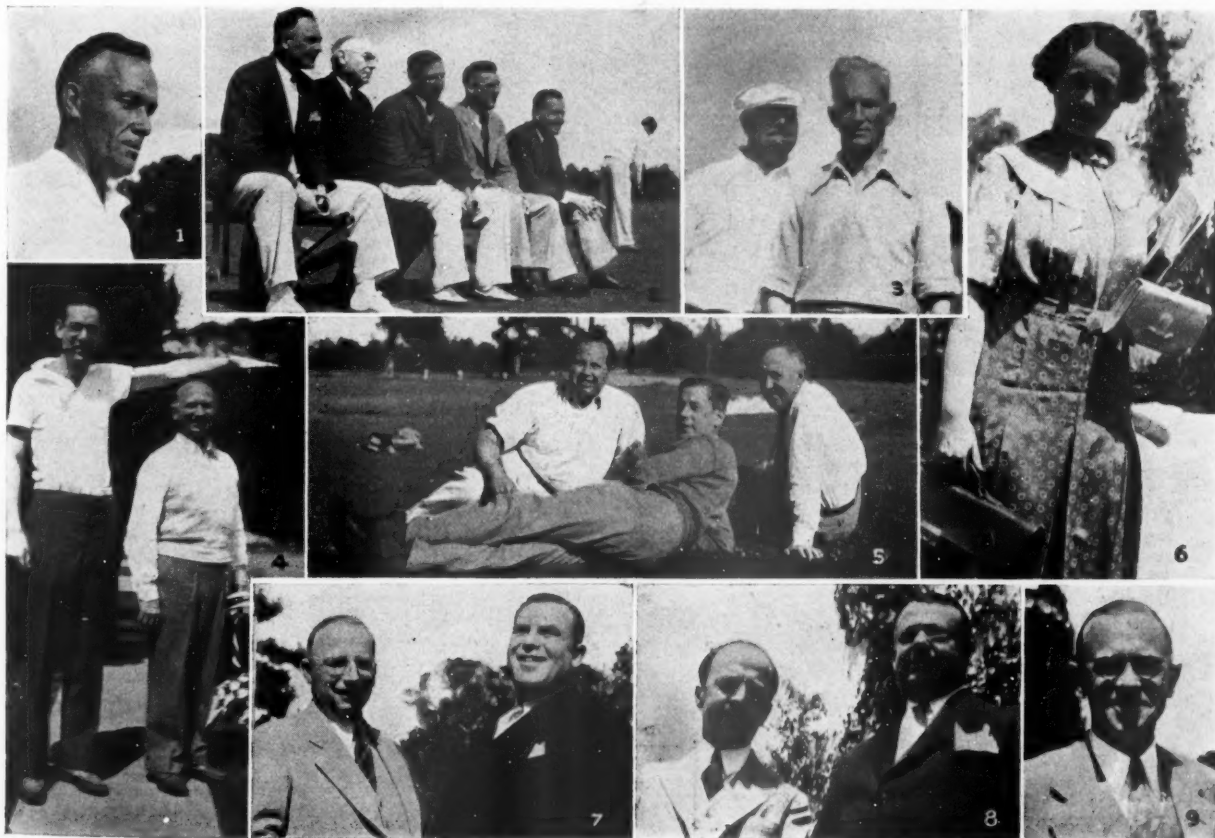
**BEST NET FOR NINE HOLES**—Winner: Mrs. R. A. McDonald. Donor: Hawley Pulp & Paper Co. Prize: Candle sticks. Runner-up: Mrs. T. J. Ticoulet. Donor: Dill & Collins, Inc. Prize: Fruit dish.

**PUTTING CONTEST**—Winner: Mrs. Andrew Christ, Jr. Donor: Brown Company. Prize: Ladies' clock. Runner-up: Mrs. C. A. Jenkins. Donor: Union Bag & Paper Co. Prize: Ladies' evening bag with cigarette lighter.

**MIXED TWO-BALL FOURSOME**—Winner: Mrs. A. Saroni and Wm. Tauerner. Donor: Columbia River Paper Mills. Prize: Coffee cups. Runner-up: Mrs. Mason Olmsted and G. J. Ticoulet. Donor: Fibreboard Products, Inc. Prize: Coffee cups.

**BLIND BOGEY**—Winner: Mrs. R. A. Gates. Donor: Nashua Gummed & Coated Paper Co. Prize: Compotes. Runner-up: Mrs. W. D. McWaters. Donor: Falulah Paper Co. Prize: Evening bag.

Mrs. A. W. Towne won the bridge tournament.



## SNAPPED AT THE 1936 PAPER TRADE CONVENTION IN DEL MONTE

No. 1 is W. W. Huelat of Blake, Moffitt & Towne, Los Angeles, the new president of the association. No. 2, left to right, C. H. Beckwith, Pacific Coast manager of Carter, Rice & Company Corp., San Francisco; I. Zellerbach, Zellerbach Paper Company, San Francisco; W. J. Pilz, vice-president and general manager, Everett Pulp & Paper Company, Everett, Wash.; E. E. Embree, Seattle manager for Carter, Rice; A. W. Akers, Seattle manager for Zellerbach Paper Co.

No. 3 catches F. R. Philbrook, Graham Paper Co., Los Angeles, telling Charles Spies at the right, of the Cupples Co., Los Angeles (Golf champion), how to win the tournament. No. 4, R. J. Elkus of the Elkus Paper Co., San Francisco, doing a Mutt and Jeff act with R. E. LeGrant of Taverner & Fricke of Los Angeles.

No. 5, Mason B. Olmsted, Zellerbach Paper Co., of Los Angeles; Donald S. Leslie, vice-president of Hammermill Paper Company, Erie, Pa., and W. D. McWaters, Portland manager for Zellerbach Paper Co. No. 6, Miss Hildegard Wahl in her working clothes. Miss Wahl has served as assistant secretary of every convention of the Pacific States Association.

No. 7, Max Oberdorfer, president and general manager of the St. Helens Pulp & Paper Company, St. Helens, Oregon, and Jack Smith (at the right), general manager of the Hawley Pulp & Paper Company of Oregon City, Ore.

No. 8, A. Ellis Frampton, sales promotion and advertising manager of the Hammermill Paper Co., Erie, Pa. At the right, E. B. Skinner, Martin Cantine Co., San Francisco.

No. 9 is J. F. Smith, vice-president in charge of sales of the Great Western Electrochemical Co., San Francisco.



#### AT THE DEL MONTE PAPER TRADE CONVENTION

No. 1, on the left, George C. Wieman, Los Angeles, and Andrew Christ, Jr., of Oakland, both with the Western Waxed Paper Co. No. 2, Mr. and Mrs. W. J. Pilz. Mr. Pilz is vice-president and general manager of the Everett Pulp & Paper Co., Everett, Wash.

No. 3, C. Francis Jenkins of the Kimberly-Clark Company on the left, and W. J. McCormick of the American Writing Paper Co., San Francisco. No. 4 shows C. J. Allair of the A. P. W. Paper Co., San Francisco, and on the right, Ira Dowd, Hawley Pulp & Paper Co., San Francisco. No. 5, A. W. Akers, Seattle manager for the Zellerbach Paper Company checks up on the scoreboard.

No. 6, Arthur W. Towne of Blake, Moffitt & Towne, San Francisco, on the left. F. C. Stratford of the Zellerbach Paper Co., San Francisco, is next to Mr. Towne. W. W. Huelat, the third from the left, is Los Angeles manager for Blake, Moffitt & Towne. On the right is C. L. Shorno, Blake, Moffitt & Towne manager in Portland.

No. 7, left to right, G. J. Ticoulat, Crown Willamette Paper Co., San Francisco; W. E. Taverner, Taverner & Fricke, Los Angeles; W. J. Gray, Paterson Parchment Paper Co., San Francisco.

No. 8. On the left, S. R. Whiting, Inland Empire Paper Co., Los Angeles, and W. A. Brazeau, sales manager Inland Empire Paper Co., Millwood (Spokane), Wash. No. 9. William Heitman on the left, Northern Paper Mills, Los Angeles. Next to him is W. J. McCormick, American Writing Paper Co., San Francisco; Jack Cote, Pacific Safety Paper Mills, Los Angeles, and Ken Holland, Carpenter Envelope Co., Los Angeles.

No. 10. J. C. Ferrin, Towelsaver, Inc., Los Angeles, and on the right, R. H. Scanlon, Powell River Co., San Francisco. No. 11. Harry Bean of the General Paper Co., San Francisco, on the left and Lew Gronich, General Paper Co., Los Angeles.

No. 12. At the left, W. B. Reynolds, secretary of the Los Angeles Paper Trade Association, and George McNamara, Capital Envelope Co., Los Angeles. No. 13. E. E. Embree, Seattle manager Carter, Rice & Co.; J. F. Weunschel, sales manager Grays Harbor Corporation, Hoquiam, and on the right, C. H. Beckwith, Pacific Coast manager for Carter, Rice & Co., Corp.

# PULPWOOD PREPARATION IN THE PACIFIC NORTHWEST

By CLARK LEWIS\*

The "First American" was the first logger. He went into the forest and selected the tree which was to be converted by him into a super-dugout, which he felled by building a fire about its base. He had no hygrometer nor sling psychrometer—nor did he realize or care that periods of low humidity are conducive to extremely hazardous and wasteful fires. In the course of the operation he may have burned a few acres or a few square miles of beautiful timber, which did not concern him in the least. There was more across the river, and he had heard nothing about posterity—nor of his obligations to it.

After months of arduous toil with fire and crude tools of stone he produced quite a creditable appearing canoe—but in this process also he wasted the major portion of the raw material with which he worked. In this century, at Neah Bay, where his descendants own the timber now being logged, one may see dozens of such dug-outs constructed in the same primitive fashion.

We, of course, have progressed—but how far? The point I wish to make is that the aborigines, with no technical knowledge or scientific instruments—and with no thought for the future—destroyed an incalculable quantity of timber for an infinitesimal finished product. But with all our knowledge—and aside from the fire angle—we today destroy and leave on the ground from 15% to 50% of the most suitable pulp timber. Even worse, of the timber successfully removed from 10% to 30% is lost or broken in transit, or ruthlessly slashed away in its processing.

Although man with his fires is the worst enemy, foresters will tell you that there are other forces at work which annually consume more timber in this region than all the pulp and paper mills combined, viz., adverse weather, insects, and fungi.

We as operators are concerned with the delivery of raw materials to our plants—not today alone—but in perpetuity. This the forester could give us if it were commercially practicable or feasible to go on the program which he calls the "Sustained Yield" basis, which is practiced in European countries with a timbered area much smaller than our own. At the same time he could refute the generally accepted argument presented to our government against a tariff on pulp and some papers—that the free admission of foreign products tends to conserve our own timber resources.

Here in the Pacific Northwest, we find the general problem of timber selection, removal, and utilization so broad in its scope—that we can handle this subject but sketchily at best. There are actually seven complete and distinct stages or phases in the recovery and conversion of forest products for pulping purposes, which are:

1. CRUISING (Forest mensuration and evaluation).
2. TIMBER REMOVAL (Logging, cordwood operations, etc.).
3. TRANSPORTATION.
4. SCALING (Qualitative and Quantitative analysis of logs removed).
5. LOG BREAK-DOWN.
6. WOOD PREPARATION (Involving removal of barks and defects).
7. UTILIZATION.

The last of these is by far the most important, for upon the ultimate use of the timber are dependent all of the other factors involved. This is a self-evident fact which is all too often overlooked. Before we ever remove a tree for eventual preparation we should know its destiny—will it go for bleached or unbleached sulphite, for kraft, or to a board mill? As an example, some Douglas fir and some unbarked cedar logs are profitably used in kraft operations. We can visualize the quality of a sulphite sheet from the same material. Also a "shaky" or shattered log might readily be chipped from sulphite or kraft usage, yet highly unsuitable for groundwood. As we briefly discuss in sequence the various phases of wood conversion, bear in mind that all important one—UTILIZATION.

## Cruising

Expert foresters with years of practical experience, proceed into the timbered areas and make elaborate and concise reports concerning topographic features—and of the availability, suitability, and accessibility of the entire timber stand by specie. In other words, forest mensuration and evaluation—which sounds like a large order, and is.

Whole libraries are devoted to this subject, and we must leave it by simply stating that which you already know—that the conifers (or evergreens) are used almost exclusively in the pulp and paper industry in the Pacific Northwest. The present order of importance among them is:

1. HEMLOCKS.
2. BALSAM FIRS (Abies).
3. SPRUCES.
4. DOUGLAS FIR.
5. CEDARS, LARCHES, and PINES.

This rating is not based so much upon their fitness for pulping as upon other factors, such as range and commercial value in other industries, which ties in with UTILIZATION. For instance, it is evident that if a \$10 Hemlock log will produce groundwood almost identical in quality with that from a \$30 Spruce, then commercially we should rate the one above the other. Speaking of groundwood for newsprint, the usage trend in this century has been from cottonwood and white fir to 100% spruce. Admixture of hemlock to spruce has since been made in such proportions that eventually a very acceptable sheet has been made wholly of Hemlock.

## Timber Removal

Our opening paragraph spoke of the "First American" who was also the first logger. After him came the pioneer with his axe and saw—and of equal import-

ance, his teams of horses and oxen. He felled and removed the accessible timber in the form of cordwood or logs by means of skidroads, a method which is still extensively used for piling, small timber and cordwood.

Just before the turn of the century, Simon Benson introduced the steam donkey into the picture. Mechanical development has been so rapid that today the Pacific Logging Congress annually holds a three day meeting, with papers, lectures, and discussions on diversified and highly technical subjects.

Shortly after the World War, a controversy or dispute over proper procedure as concerns pulpwood removal developed between some of the best authorities of the Northwest. As this subject is of vital interest to the industry, it would be well to give it some attention.

One faction advocated continuance of the "Pioneer" system and the removal of suitable species in prepared cordwood form. Some excellent arguments in support of this method were advanced—chief of which was that no capital outlay was needed, and that it was unnecessary to hire and maintain a trained technical staff.

The other group, mostly logging engineers, contended that modern times pre-saged or ordained modern methods—that as timber became more inaccessible difficulties in "bull-team" removal would become insurmountable, and that the system would eventually fail altogether.

Inasmuch as both methods are successfully employed to this day, one is reminded of the story of the medieval feudists who battled for years over the color of the shield worn by a famous departed warrior. One side contended that the shield had been black, while the other stoutly maintained that it was white.

After many casualties, some Will Rogers of the period suggested that they dig the deceased gentleman up. This was done, and they found him peacefully reposing on a reversible shield—one side of which was black—and the other, white.

## Transportation

Water is still the cheapest and the best agent for conveying wood in any form, but rail development has been made necessary by the early depletion of timber along the waterways.

The pulp species (more particularly hemlock) have been left adjacent to water—thanks to our fore-bears, who practiced "selective logging," and didn't know it. Early loggers did not remove hemlock for the reason that it then had but little commercial value. In consequence, the timber thus left became seed trees, and in many instances reforested the denuded areas.

Unfortunately, however, hemlock—due to its high specific gravity in certain seasons—doesn't always float. We know of one cut-up plant located near the log-dump, where "sinkers" are converted into prepared wood and chips. These prod-

\*Pulp Division, Weyerhaeuser Timber Company, Longview, Washington. Presented at the TAPPI Dinner Meeting, Portland, Oregon, March 24th, 1936.



ucts are then conveyed to the mills by means of scows and barges.

#### Scaling

Except for an occasional article appearing in lumber trade journals, there is no written data to be secured on this subject. No very definite rules are laid down, as there are in lumber inspection and grading, for example.

The scaling fraternity is an exclusive one, and it is made up of men whose first requisite is inherent honesty. Through years of association with timber—in the forests, in the water, and in the mills—the scaler must be able to inspect and judge for specie, grade, and quantity the merchantable content of any given log, raft, or boom. Something like telling you what is in a package before you open it.

Although individual free-lances do a great deal of the work, in some districts an impartial bureau scales and issues a certificate that the transaction has been accomplished "without fear or favor."

In all districts, however, the application of an antiquated rule—Spalding, Scribner, or British Columbia—somewhat nullifies the work of the individual, and makes for great fluctuation in pulp and paper yields. All rules in general use are based on the lumber content of a log, and not on pulping suitability.

#### Log Breakdown

We come now to a subject which has been the most highly controversial of the lot. We have spoken of the advocates of (a) prepared pulpwood (which entails breaking up the log on the ground). In addition we have those who favor (b) the steam splitters, vertical or horizontal; (c) band sawmills; (d) circular sawmills, and (e) those who see no necessity for breaking down the log at all (chipping it in its entirety).

Just as in the different types of logging, each of the above has its merits and demerits. All of them are dependent first upon UTILIZATION, as we have said so many times—and upon further factors of equal importance, such as the size, location, and physical characteristics of the timber to be processed.

When one considers that in the past few years nearly every mill wholly dependent upon prepared cordwood has gone to raw material in some other form—and that practically every steam splitter operation has been supplanted by a sawmill—it would seem there is a little more to be said.

#### (a) Prepared Wood

Mills operating on prepared cordwood found as the years progressed that the accessible timber was being depleted—and that the longer truck hauls entailed higher delivered costs. At the same time, the depression practically threw logging and sawmill machinery into their laps for a song. If they wished to purchase logs, they could do so on a basis which would not permit the cordwood operator to compete with the commercial logger and exist. "Stump-ranchers" who had been the main source of supply were moving to other localities, and it became a matter of subsidizing individual cordwood contractors or of taking the operations over themselves—which the mills were loath to do.

For the purpose of augmenting the main supply—especially in periods when logging costs are out of line, and as a means of furnishing seasonal employment to small ranchers—much can be said in favor of purchased prepared cordwood. It is the equal in every respect to that produced by sawmills, if



CLARK LEWIS  
Pulp Division, Weyerhaeuser Timber  
Company, Longview

properly supervised and rigidly inspected on delivery.

#### (b) Steam Splitters

Most of our early pulp and paper operators were from the East, where because of the nature of the timber or of the operations themselves the splitter mill was considered the last word in log breakdown.

The greatest argument in favor of the splitter is that it saves you that portion of the wood lost through kerf in sawing. If all timber were uniformly straight grained and free from knots that might be true, but it does not work out in actuality. There was one plant (since dismantled) which was Diesel-powered on the theory that there would be no waste for conversion to steam. While in operation, this plant kept one or two men busy carting away refuse and burning it up.

Some of the main things against the splitter are that it is extremely dangerous, and that the waste increase is inversely proportional to the length of wood split. Four feet is about the maximum length which can be split mechanically, and in these days of longer and longer cants for chipping, the splitter is becoming obsolete.

#### (c) Band Sawmills

There can be no argument as between band and circular mills if the money is available for the initial investment required for filing equipment, extra saws, etc. With a kerf of 8/32" as against 13/32" for the circular, it is evident that large wood savings will develop through use of the bandmill—enough, in fact, to warrant the installation and to compensate for the higher operating costs.

#### (d) Circular Sawmills

Circular rigs call for a much lower capital investment—are more mobile, and can be put up in portable form for movement into the timber to be converted.

#### (e) Whole Logs

The prediction was made a few years ago that logs would be peeled in the woods or in the water—and then chipped in their entirety—with no breakdown. By this was meant average logs, and not poles and piling, similar to Eastern pulpwood.

Although this prediction was received with some skepticism, there are at least two mills operating today on logs with a top diameter up to 20"—and from ten to forty feet in length.

While in some instances it may not be necessary to break down the log at all, it does not follow that the chips thus produced would be suitable for all types of pulp. Black knots, fluted and encased bark, and bark seams from the whole log might seriously degrade bleached and unbleached pulps sold in competition on the open market. It has been found necessary in our company to cut cants to eight inches for bleached sulphite and to four inches for unbleached sulphite—this to enable wood inspectors to cut or bore out just such defects.

Some operators have advocated the installation of Swedish gangs for log breakdown—on the principle that they would reduce kerf losses still further. Their only use in the industry up to the present time has been with those lumber operators who sold slabwood to pulp and paper concerns.

#### Wood Preparation

Ever since forest products were first utilized for paper, removal of bark and cambium layer has been one of the greatest single problems in the preparation of the raw material. This subject might have been considered before that of LOG BREAKDOWN, for, as we have seen, there are times when bark removal is accomplished before the logs are cut up. However, conventional operations today generally remove bark and other extraneous matter (black knots, etc.) after log breakdown.

Although there are as many inventions, devices, and theories concerning bark removal as there are individuals engaged in wood preparation, they may all be classified under some one of the following basic methods:

- (1) Hand peeling or spudding (cordwood preparation).
- (2) Rubbing or tumbling (principle involved in drum barkers, Thorne barkers, and the like).
- (3) Mechanical cutting (Rossers, disc barkers, planer-head barkers, and patented devices—Gruber, Stetson-Ross, etc.).

There is still another basic principle, which—though not now in use—very probably will be in the next decade. Every three or four years some individual engaged in pulpwood preparation feels that he has hit upon a novel, cheap and effective means of removing bark and the cambium layer from logs—and that is, by hydraulic applications. If he takes the pains to write the Patent Office he finds that a dozen or more patents have been issued on log barking devices in the past quarter century—all embodying that same principle. Patents have been granted recently on the machinery involved in rotating the timber to be processed, and upon the various jets, nozzles, and other equipment used in connection with the water application—but the hydraulic principle itself is unpatentable. To date, the greatest drawbacks to commercial use of the method have been (1) inadequate nozzle design, (2) excessive power requirements, and (3) economical disposal of waste. Such enormous strides have been made in recent years in the science of hydraulics, however, that it is not beyond the realm of probability to state that we may soon see an economical, efficient, and practicable hydraulic barker on the market. It certainly will be most effective, and will not waste and destroy fiber

substance as do mechanical barkers.

Let us return to a discussion of the three methods of bark removal which are actually in general use.

### (1) Hand Spudding

For effectiveness and economy there is probably no other method of bark removal which is as efficacious as that one which is the oldest of them all, viz.—peeling by hand. No capital investment here, for the only equipment necessary is a spudding tool (an ordinary garden spade does very nicely), and the work can be performed anywhere—in the woods, on the landings, in the water, or on the log deck at the mill.

This work is generally contracted—and runs from 50c to \$1.00 per M—dependent upon the degree of cleaning desired and the size of logs to be processed. Saving in wood fibre alone more than compensates the operator for this type of barking. There is one requisite, however, and a most important one. Timber must be felled during the sap-running season when the bark is loose. That period is from about the first of April to the middle of August in this country.

### (2) Rubbing or Tumbling

The most common of the barkers in general use employing this principle is known as the 'drum barker', the construction of which is familiar to you all. Very effective, there is nevertheless a tendency toward 'brooming' the ends of the wood being processed. As the wood and loosened bark are shaken up together within the drum, it is only natural that the 'broomed' ends should pick up quantities of dirt and bark particles in the course of the operation. For that reason more than any other, it may be said that the 'drum barker' has very definite limitations insofar as UTILIZATION of the processed wood is concerned. Its use should be confined to kraft, groundwood, and board mills.

Utilizing the rubbing principle is the patented 'Thorne Barker,' used rather extensively in Canada, and to lesser extent in the Eastern United States, where timber processed is smaller than that from this area.

The machine consists of three trough-shaped pockets, in the bottom of which are slots thru which cams impart a lifting, falling, tilting, rolling and rubbing motion to the wood. Logs are fed by conveying machinery into one end of the machine, and are discharged from the last pocket at about the same rate as fed. Bark removal is assisted and hastened by the application of heavy sprays of water. It is claimed for this machine that timber is cleaned sufficiently for any pulp making process, and that in addition there is no 'brooming' of the ends of the wood as there is with the 'drum barker'.

### (3) Mechanical Cutting

The most wasteful of all the barking methods employed, this is nevertheless the one most generally used in some form or other. Timber today is cheap, and the various barkers employing the cutting principle can deliver cleaner wood in greater quantity than can be secured by any other accepted process.

Probably the greatest value of the cutting principle lies in its ability to recover clean fibre from timber which has been scorched and burned. It is also extremely effective in removing 'cat-faces', sapstain, and other defects which have grown into the very wood itself.

### Utilization

As concerns grinding and chipping processes and machinery, it seems that all our progress has been along the line of increased production rather than in improving preparation methods and the resultant product. For example, chippers have been built which are sturdier, speedier, and larger—thrust bearing installations have shown decide improvement—but still the chip quality (nearness to set standards) remains about constant.

There has been a tendency toward force-feeding wood for the elimination of tumbling and bouncing in chipper spouts—which is the cause for practically all slivers, sawdust, and abnormally long or short chips. There are, in fact several patented power-feed attachments, and yet we still have the conventional revolving disc with knife arrangements for reducing wood to chips suitable for cooking.

The very method itself might be entirely changed for a super-quality pulp. As a suggestion, for a superior product selected logs (called peelers in the veneer industry) might be rotary cut. Chips could then be stamped out in squares—say, exactly 3/4-in. in width and length. If the cores were utilized for groundwood, there could be no wood waste whatsoever. There being no sawdust, chip screens could be dispensed with, and the pulp manufacturer could be given something he has perhaps dreamed of but never expected to see—a digester full of chips each one of which is identical with its mates in all dimensions.

We all know of Elbert Hubbard's statement concerning the man with the better mousetrap. It is not improbable that some one of us may evolve—say—a better chipper spout than our neighbor's—and thus receive the beaten path to our doorway.

### Conclusions

Let us for a moment visualize the possible wood operations of the future.

The government might own the timber—taking the burden of initial investment, fire-protection costs, and excessive taxation on non-productive acreage from the private operator.

In the hands of competent foresters, timber would then be removed on definite plans, which take into account age, disease, and other factors governing the timber stand. Severance would not then be in a race against time and the tax-collector, "selective logging" would be an accomplished fact, and the industry would be definitely placed on a "sustained yield" basis.

Of the timber removed, each and every log should then be graded, stamped or branded—"ear-marked" for a definite industry or process—and sold to the private operator according to his needs and uses at a reasonable price commensurate with his expected return on the finished product.

Reserve and storage of timber against future needs of industry being handled collectively—there should be no staying awake nights, nor mad scrambles to buy up all the existing wood in competition between industries and individuals. The operator should then have time to devote to the all-important phases of manufacture without concern for raw material deliveries.

As to processing—we may find more men employed and higher wood unit values—but the conservation and utilization practiced should more than com-

pensate for increased processing costs.

Just as the meat-packing industry is reputed to save everything but the squeal—so should the timber delivered be utilized in its entirety. With tannic acid and other extracts from the bark—the residue plus rotten wood as fuel for steam and power—suitable wood fibres might then be wholly converted to useful and necessary products.

### CROWN WILLAMETTE GIVEN PEAR WRAP ORDER

The Oregon-Washington Pear Bureau announced at a recent meeting of the trustees that the Crown Willamette Paper Company had been given an order for the new Hartman treated pear wrapper.

This organization embraces pear growers in Yakima, Wenatchee, Hood River and Medford orchard areas.

### OLYMPIC FOREST BUILDING NEW WAREHOUSE

The Olympic Forest Products Company of Port Angeles is constructing a new warehouse 126 by 140 feet.

The building which is to provide storage for pulp in rolls is being built on the other side of Ennis Creek from the mill.

A row of garages for the automobiles of company employees are also under construction.

### COLUMBIA RIVER RESUMES OPERATION

The Columbia River Paper Company at Vancouver, Washington, resumed full time operation May 4th after a shutdown of several weeks.

In addition to the pulp and paper mill the sawmill was started after having been idle since the first of the year.

### WEYERHAEUSER PULP DIVISION MOVES INTO NEW OFFICES

The Pulp Division of the Weyerhaeuser Timber Company at Everett, Washington moved into its new office building adjoining the pulp mill April 30th. During the construction period the pulp mill officials and the engineering staff have been housed in the lumber division's office building.

### IDAHO GRADUATE RECEIVES INSTITUTE AWARD

Mr. Leslie L. Larson, Potlatch Forests Fellow of the School of Forestry of the University of Idaho, has been awarded a scholarship by the Institute of Paper Chemistry at Appleton, Wisconsin, for graduate work leading to a Ph. D. degree, according to an announcement by Professor Edwin C. Jahn of Idaho.

The scholarship becomes effective next fall. Mr. Larson, after graduating in chemistry from the University of Idaho, was appointed to the Potlatch Forests Fellowship in 1934 by the Idaho School of Forestry. He will receive his Master's Degree this June. Mr. Larson's studies have been in wood chemistry.

### VERNON SCOTT PROUD FATHER

Mr. Vernon C. Scott, president of the Packer-Scott Company of Portland, Oregon, distributors of wrapping paper, bags and twine, became the proud father April 15th upon the birth of a nine and one-quarter pound son.

# FOREST RESEARCH AND THE PULP INDUSTRY IN THE PACIFIC NORTHWEST

By J. ELTON LODIEWICK\*

Pulp and paper has become one of the main industries in the Pacific Northwest, now ranking second only to lumber manufacturing, an industry with which it is in a mild but increasing competition for basic raw material. The industry uses under normal operating conditions nearly 2 million cords of wood a year, and producing nearly a million tons of pulp and  $\frac{1}{4}$  of a million tons of paper. The expansion of the industry is attributable in part to the markets opened by increased local population and by increased per capita consumption of paper products. But in large degree, the development in the Pacific Northwest may be attributed to natural advantages, prominent among which are adequate water supplies and an abundance of suitable wood at a reasonable cost.

The Division of Research of the Forest Service maintains forest experiment stations in each of the regions of the country established for administrative purposes. The Pacific Northwest Forest Experiment Station here in Portland is one of these, covering Oregon, Washington and, in name at least, Alaska. In addition to the forest experiment stations the Forest Service maintains the Forest Products Laboratory at Madison, Wisconsin. At this point is concentrated practically all of the technical work on wood, wood utilization, and wood products. The three western forest experiment stations, (Missoula, Portland and Berkeley) have forest products sections. These act as liaisons between the Laboratory and the industry—somewhat like branch offices with no direct administrative connections, but interested in the same problems. The Laboratory has equipment for almost every kind of a test or experiment; the products sections have no laboratories and usually confine their investigations to those that can be conducted on going operations, either in the wood or in the mill. For this reason the experiment stations are not duplicating the research of the technical men in the industry.

The latest project of the Forest Products Laboratory has brought to light some definite relationships between wood quality, as expressed by rate of growth, density and percentages of summerwood, and pulp quality in the southern pines. The theories developed are now being applied to west coast species. The first of the test material, some 12 cords of hemlock and spruce selected by members of the experiment station staff to show extremes of growth rates in both old and second-growth timber was shipped to Madison early last month.

## Local Work

The nearest any of the local experiment station work approaches that of the Laboratory is in some of the projects carried on by the section of forest products. During the past two years there have been two of direct interest. The first of these was a study of the solid wood content of pulpwood cords,

(published in the September 1935 issue of Pacific Pulp and Paper Industry) and of the degree of commercial utilization of trees of different sizes. Data on approximately 200 cords show that the average standard cord of peeled split wood contains 86 cubic feet of solid wood, and 42 cubic feet of air space. This applies to all the pulpwood species measured.

At the time the cords were measured there were opportunities to determine the percentage of total wood volume used in trees of different diameters. These data were obtained on old-growth white fir and hemlock in the Cascade Mountains of Oregon and on second-growth hemlock and spruce at Grays Harbor. In general the percentage of total tree volume left in stumps is not a factor of tree size, and averages around 5-6 per cent. The percentage left in tops, however, is markedly large in small trees (about 50 per cent in 10-inch trees), decreases until it reaches 12-15 per cent in 20-25-inch trees, and in larger trees is not influenced by tree diameter. In addition to the amount left in stumps and tops there is an additional loss averaging 2 per cent in small trees and 6 per cent in large trees attributable to breakage. Thus the intensity of utilization varies from about 35 per cent in 10-inch trees, to 80 per cent in 20-25-inch, and back to 75 per cent in large trees (40-45-inch).

## Identification of Woods and Fibers

The second products project of direct interest was one on the identification of woods and wood fibers used in the manufacture of pulp. This was a cooperative project with the College of Forestry of the University of Washington at Seattle. It is now used as a text in the Institute of Paper Chemistry at Appleton, Wisconsin, and has since been reworked and tentatively accepted as a standard testing method by TAPPI. It is essentially a manual of wood structure and contains descriptions and keys for the identification of the woods and wood fibers now used by the industry.

## Indirect Work

So much for the direct contacts the Pacific Northwest Forest Experiment Station has with the pulp and paper industry. The more indirect contacts center principally around present and future supplies of the basic raw material, wood. About a year and a half ago, Mr. Munger, the director of the Station, presented to you the results of the inventory phase of the Forest Survey in this region. You were told then that west of the Cascades in Oregon and Washington there were 170 billion feet of the recognized pulpwood species in trees of saw-timber size. During the past year the Survey data have been reworked to show the available quantities of pulp species in cords and in cubic feet. The total is greater than those presented before, because timber of smaller size has been included.

In western Oregon and western Washington there are 378,394,000 cords of pulpwood species (exclusive of Doug-

las fir) available for cutting, that is on lands from which the removal of timber is not now prohibited by statute. This quantity is actually available in trees over 7-in. D. B. H. because in converting tree volumes into cords the amount that would normally be left in the woods as tops and stumps was not considered. The additional quantity of sound wood available in cull trees (trees over 2-3 defective) increases the available supply by 8,756,000 cords, making a total supply of the pulpwood species of approximately 387 million cords—sufficient to provide the present pulp industry using 2 million cords a year, for nearly two centuries. The present standing timber would last the present pulp industry 200 years if an appreciable proportion were not going to be demanded by the lumber industry, if portions of it were not going to be destroyed by fire, insects or disease, and if all of it were so located that it could be laid down at the pulp mill at a reasonable cost. Since there is no way in which to predict most of these factors it may be best to leave well enough alone, and to assume that insect, disease, and fire losses will be kept to a minimum and that the industry will be able to maintain its relative competitive position. Even if half of the available timber were to be unavailable to the industry, it would still be assured of a century of operation at its present production, even if no growth were expected.

## What About Future Growth

This raises the question as to what future growth may be expected in this region. We are apt to hear conflicting statements based either upon inadequate knowledge or upon the fond hopes of ardent boosters of various portions of the country. The data on file at the experiment station and based upon measurements of many permanent sample plots permit the following estimates of growth in western Oregon and western Washington. Current annual growth for all pulpwood species is estimated at 3,000,000 cords and is being produced in all the second-growth stands of pulpwood species. The realizable mean annual growth, 2,600,000 cords, is the hypothetical average annual growth of all existing stands from now until the time they are cut. The potential annual growth, estimated at 9,900,000 cords, is that obtainable with intensive forest practice on all commercial land after all virgin forests have been replaced by young forests. These growth figures were originally computed in cubic feet and were converted to cords by assuming 86 cubic feet of wood per cord. The volumes are somewhat high because no deduction has been made for the amount left in stumps and tops. As yet, this has not been segregated by species and it may never be practical to do so because of the uncertainties surrounding composition of future stands.

Thus from the standpoint of supplies of wood, both present and future, it seems logical to conclude that the industry is well fixed, and can anticipate expansion without encountering a shortage.

\*Pacific Northwest Forest Experiment Station, U. S. Forest Service, Portland, Oregon. Presented at the TAPPI Dinner, Portland, Oregon, March 24th, 1936.



The relation between the use of the pulpwood species and the proportion of these in the present stand may permit speculation as to what species may be used in the future. During the past few years about 75 per cent of the wood used has been hemlock, with other species such as Sitka spruce and balsam firs running poor seconds at 8-10 per cent. But of the remaining available pulpwood timber western hemlock makes up 60 per cent, the balsam firs 30 per cent, and other species negligible amounts. It so happens that the lumber industry is in keener competition for hemlock than for the balsam firs, thus tending to exaggerate the differences between the proportions of these species used and proportions available. Does this mean that in order to continue a reasonable wood cost the industry must use increasing proportions of the balsam firs? If so, is the industry ready to do it?

#### Wood Cost

The next logical point to consider might be that of the cost of this wood, a large factor in a region at some distance from the main consuming centers, and about the only item of manufacturing cost which differs sufficiently to offset extra transportation charges. The Experiment Station has estimated the economic availability of present stands of pulpwood species. Three classes were established (1) that which can be logged at a profit under the production and marketing conditions prevailing in 1925-29; (2) timber that under those conditions could be logged at a loss of not more than \$5 per M feet or \$2.50 per cord; and (3) the remaining timber. It is found that 181½ million cords or 48 per cent of the present pulpwood stands is in Class 1. Of this, 25 per cent is on the national forests and 75 per cent on other public or private lands. In Class 2, which could be logged at a cost not over \$2.50 per cord higher, there is 43 per cent of the total of which slightly more than half is on national forests. Only 9 per cent of the present stand is potentially unavailable because of inaccessibility, and practically all of this is on poor sites at high elevations and will always be more valuable as watershed protection. It is also worthy of note that the larger part of the easily accessible timber is in private hands, and that the national government is holding the more remote an inaccessible tracts. It is also interesting to note that accessibility is quite generally associated with good growing conditions, hence it is safe to assume that the greatest portion of present and future growth will be in Class 1 accessibility.

To fully analyze the availability of future expected stands, factors other than growth and accessibility must be taken into account. Prominent among these are (1) reproduction of stands harvested (2) protection of growing stands from fire and (3) the problems and responsibilities of land ownership. In these phases the Experiment Station has something to contribute. Let us consider first the reproduction phase. As a general rule the forests in the Pacific Northwest will reproduce themselves, even after clear cutting and burning, if the area is not so extensive but that all parts are accessible to a seed supply from green timber, and if subsequent fires are kept out of the young stand. The absence of reproduction on extensive areas in the region can be at-



J. ELTON LODEWICK  
Pacific Northwest Forest Experiment  
Station

tributed to one or both of these factors. Knowing this we can (1) so arrange the harvesting operations that no part of the area cut over will be out of reach of natural source of seed supply and (2) protect the area from reburning after the new generation of trees has become established. The species in this region are very subject to windfall, hence the leaving of isolated seed trees is not practical. Over 70 per cent of these are dead or down within ten years. Therefore if we must retain our present practice of clearcutting we must leave solid blocks, strips or large groups of green timber at frequent intervals (approximately every ¼ mile) if we would obtain reasonably rapid and adequate restocking.

#### Clearcutting Wasteful—Expensive

The more recent studies of timberland management indicate that clearcutting whether over extensive areas or in blocks is not only the most wasteful method of harvesting, but that it may be the most expensive. The data shows that through the use of caterpillars, trucks, and other light mobile equipment, the railroad system may be skeletonized to such an extent that it no longer looms so large as to force clearcutting in order to keep down the per acre cost of operating. Tractor and truck roads are less expensive to construct and maintain, therefore it becomes feasible to remove a relatively small portion of a stand with the expectation of coming back again and again for future cuts. This leads immediately to selection of the larger and higher value trees in the initial cut, leaving the others to increase in value, and providing openings in the forest cover under which natural reproduction establishes itself. Thus, theoretically at least, there is a perpetual forest on the area, new trees are coming on to replace those removed, and the forest growing stock or forest capital is maintained at a uniform or even an augmented volume. Many foresters are still reluctant to advocate this economic selective method until some of the resulting conditions have been evaluated. The removal of a few scattered trees per acre immediately introduces the problem of slash disposal. There is some ap-

prehension that the slash will create an undue hazard if unburned; piling and burning is expensive. Windfirmness again enters the picture and opening up the stand may result in excessive losses from this source. And finally, but not by any means least, is the possibility of so changing the stand composition that the next generation of forest on the area will contain a high percentage of the less valuable species, thus in the final analysis decreasing the forest capital. The problem in establishing and maintaining future crops of trees are still so numerous and the need for their solution so pressing that forest research men cannot rest on their oars when any intermediate goal is achieved.

#### Problem of Stocking

Even if we were to decide today to so harvest our remaining forests as to insure a future crop, there is still the problem of restocking on over 4¼ million acres of cut-over and burned land. Over half a million acres were cut-over prior to 1920. If they were going to restock naturally they would have done so by now. Slightly over 2 million acres is land cut over since 1920; there is hope for natural regeneration on a part of this but no one will even guess how much. We might expect the proportion to be rather low knowing that the past 10-15 years has been one of extensive large-scale clear-cutting operations. The remaining 1½ million acres is made up of non-restocking burns. Some of this has been burned and reburned and must eventually be planted. Some of the acreage has been burned but once and the 150,000 acres included in the Tillamook burn of 1933 might be considered as typical. Sample areas in this burn were studied last summer and on the plots selected as representative 70 per cent of the area had reseeded, with stocking varying from adequate to inadequate. In any event there are enormous areas in the Pacific Northwest not now showing evidence of production; a waste not only from the standpoint of their inability to provide raw materials for industry but also because they provide no tax revenues. Planting these areas will be expensive, but should be done eventually.

In an effort to reduce artificial regeneration costs the station has experimented with broadcast seeding. Unsatisfactory results were obtained with the large-seeded species such as Douglas fir and hemlock. Excellent results have been obtained, however, with the small-seeded species like spruce, cedar and alder, when broadcast on fresh burns. Perhaps this partially answers the planting question in the coastal fog belt.

#### Fire Protection

Mention has been made of the necessity of fire protection if the land is to continue in its highest productive state. It is poor economy to grow trees only to have them destroyed by fire. Everyone is appalled when a section of virgin forest flares up in one great conflagration, while the greater but less spectacular fires on areas previously burned or in second-growth stands frequently pass unnoticed. The immediate monetary losses in the latter are less but the potential losses may greatly exceed those following fires in virgin stands. Recurring fires destroy reproduction and may so change soil conditions that the establishment of future crops by natural means impossible. One of the main objectives of the Forest Service has been the

prevention of avoidable fires, and the prompt detection and suppression of those that do occur. The Experiment Station is contributing to this in several ways. Within recent years devices for measuring fire hazard have been developed, prime among which are a set of inexpensive but accurate weather instruments, and a unique method of measuring cumulative hazard conditions of fuels such as brush and down timber. The detection phase of fire protection has not escaped notice. The physicists have perfected a neat little device, called a haze meter, whereby the degree of visibility at a given moment is readily ascertained. Studies on visibility have provided the basis for lookout location so that maximum safe coverage of an area can be assured at minimum cost. A simple eye test has been developed that helps in the selection of lookouts. Investigations of various goggles have resulted in colors and types that reduce eyestrain without interfering with smoke detection. Studies on going fires have yielded valuable results as to fire behavior under different fuel and topographic conditions, and from which we are now able to rate in advance the relative hazard on a given area. Knowing this and the work to be expected per man, those in charge of suppression are able to judge the size of crew required. There seems to be no doubt but that research and personnel training will continue to lessen fire losses.

#### Land Ownership

Land ownership problems provide one of the most complex factors affecting the availability and stability of timber supplies. A stable future supply can be assured only under a stable land ownership, which is certainly far from visible now. Land is reverting to county ownership at an unprecedented rate—and the most discouraging feature is that such reversions are not confined to worn-out farm lands and cut-over forest areas. Of late years many thousands of acres bearing stands of sawtimber size have passed into county ownership. The cost of ownership has become too great; the value of the timber does not warrant continued expenditures for protection costs and carrying charges. But every acre so reverted narrows the confines of taxable property and often results in additional levies on the remainder because of subversive uses such as attempted settlement for farm purposes where the area is too small or too remote to contribute adequately to the support of roads, schools and other improvements. The demands of the settlers in these often remote areas continue even after the timber, the source of revenues for satisfying the demands, has been exhausted or removed from the tax rolls. The foregoing is a natural consequence when forest lands are not being managed for forest uses and are being held in unstable ownership largely for speculative purposes. There is little doubt but that this sequence of events has contributed very materially to the exorbitant carrying charges on standing timber. A recent analysis by Mr. Sinclair Wilson of the Experiment Station shows that in 1934 the average tax burden on forest land in forest ownership in Washington figured against the timber cut amounted to \$0.80 and in Oregon to \$1.47 per thousand feet of production. This is probably somewhat in excess of normal because of curtailed lumber production during that year. But even if produc-

tion were to be stepped up to the maximum indicated by the producing capacity of the lands now in forests, the burden would approximate \$0.50 per thousand feet in each state, other things remaining equal. Whenever the tax burden forms an undue share of the expected revenues there is an urge to speed up the cut and to liquidate low value timber holdings. If the owner-operator steps up production he is annually subjected to higher carrying charges on the uncut remainder. If he sells a portion of his holdings to some other operator he has merely shifted the responsibility and has not improved the position of the industry. Perhaps he has weakened it even further by encouraging a larger degree of overproduction. If the operator lets a part of his land revert for unpaid taxes he gains nothing. In the absence of compensating subventions the tax levy increases in proportion to the amount thus withdrawn from a revenue-paying basis.

#### Private Versus Public Ownership

That is a brief picture of land-ownership problems as they are. Some individuals incline to the view that the failure of private ownership is clearly indicated, and that the only solution is widespread public ownership of forest lands. Others feel that public ownership is to be deplored and that private ownership should be encouraged in every way. By far the majority of those who have given the problem serious thought believe that both types of ownership have a part, that private ownership on certain types of land should be encouraged in every way, and that all forest land, regardless of ownership, must be integrated and maintained at its highest producing capacity. Forest research men are mostly in this group, but are not willing, as yet, to designate the proportion or classes of land to be held in each ownership. They do agree, however, that the ideal to be attained is the proper management of all lands best suited to timber growth so that they will yield the maximum sustained revenues. But such an ideal may be somewhat in the future, and certainly does not alleviate the distress resulting from past mismanagement, or provide immediate relief from a well nigh intolerable situation. The problem, stated as simply as such a complexity can be, seems to resolve into two main approaches (1) reduction in the cost of local government and (2) relief to the timberland owner.

The curtailment of expenditures in local governmental units may be achieved in many ways. The one that appears to be most easily and painlessly achieved, and the one in which those interested in land use are concerned, is the curtailment of services to out-of-way portions of the area. In almost every county there are striking examples of small numbers of settlers located on lands unsuited to agriculture eeking out a precarious existence, and demanding services out of proportion to their contributions to the community. At the same time their land holdings prevent the blocking out of land areas for economic management, and their presence in the midst of forest areas constitutes a constant additional fire hazard. Is not the sensible thing to zone our rural areas, as is the tendency in our metropolitan areas, assigning to agricultural settlement the land suited to crop production, and assigning to forestry the lands adapted to the production of continuous crops of wood?

Relief to the operator may logically take one or more of several courses. There are those who believe that the timberland owner should receive government aid through the medium of long-time low-rate credit, and that this is justifiable on the basis of national welfare. Another suggestion is that forest areas be taxed more in line with agricultural lands by having the bulk of the tax deferred until the crop is harvested. This meets opposition from many county officials because expected revenues 10, 15 or 20 years hence do not meet current expenses. Perhaps this objection might be overcome through the extension of state credit to counties in the interim. The suggestion has also been made that some form of subsidy be extended to operators who manage their timber holding efficiently. The research units of the Forest Service have devoted a great deal of time to these subjects. I am not going to attempt to bring our ideas before you in the limited time at my disposal. I wish merely to present the picture for your consideration, and to stress that the interests of the industrialist, the timber owner, and the community are so interwoven as to become one great interest.

The problem of producing adequate continuous supplies of wood is, in the final analysis, dependent upon a stable land ownership. Only if and when ownership can be stabilized can an approach to sustained yield be expected. Land ownership has not yet settled down in this country as it has in many European countries. Perhaps this is attributable in large measure to the fact that we are a comparatively young nation. But does it not seem logical to expect that we can capitalize on the experience of these older nations, and thus sooner and less painfully attain the stabilization of ownership?

In summary, I think we all agree that the future of an industry with large investments and immobile equipment is dependent in large degree on a stable supply of basic raw material. I have tried to point out the more important of the factors affecting the stability of timber supplies. A great deal of thought must still be given to the mechanics of managing our timber lands for sustained production. Ways and means must be found for bringing mismanaged and in many cases now worthless lands back into production as quickly and as inexpensively as possible. Protection from the ravages of fire, insects and disease must be intensified. And finally, but of prime importance, land ownership and timber production must be stabilized.

#### IMPROVED PAPER MACHINERY JOINS TAPPI

The Improved Paper Machinery Corporation of Nashua, New Hampshire has recently become a corporate member of TAPPI.

The company manufactures under the Impco trademark vacuum filters, washers and thickeners, pneumatic savealls, water filters, knotters, centrifugal screens, tailing screeners, non-sagging cylinder molds, multiple stage deckers and washer, and flat screens with the Dunbar drive.

Mr. John P. Rich, secretary of the company will be the representative in TAPPI. Mr. Walter L. Barker is president and Mr. John H. Noble is vice-president.

Mr. Kenneth B. Hall of Portland, Oregon is Pacific Coast representative of the Improved Paper Machinery Corporation.

## AMOUNT, GROWTH AND YIELD OF PULP SPECIES ON THE OLYMPIC PENINSULA

By E. J. HANZLIK\*

The pulp timber types in the Pacific Northwest may be segregated into three principal divisions. First, the spruce-hemlock type occurring mostly on the lower slopes from sea level to about 1500 feet elevation on a strip from about 25 to 40 miles wide from Northern California through Oregon, Washington, British Columbia and Southeastern Alaska; second, the so-called pure hemlock type predominating on the western slopes of the Cascade range, in Northern Oregon, Washington and Southern British Columbia, and portions of the Olympic Mountains, occurring at elevation mainly from 100 to 4000 feet; third, the balsam type found principally above the hemlock stands in the Cascade range extending from Northern California well up into British Columbia, at elevations above about 3000 feet to 6000 feet.

The distribution of these three types is confined principally to regions of heavy precipitation with an annual rainfall of 60 inches or more, and where the humidity is relatively high. This is a region of comparatively low fire hazard with excellent forest production conditions.

These pulp species comprise a volume of approximately 26½ billion cubic feet in Western Washington. Upon the Olympic Peninsula, with which we are principally concerned, there are approximately 10 billion cubic feet, or about 38% of the total in Western Washington. In this connection it may be said that the Olympic Peninsula is considered to consist of Grays Harbor, Jefferson, Clallam and Mason counties.

From figures recently obtained by the Pacific Northwest Experiment Station under a study conducted by Dr. Walter H. Meyer, it has been found that the pulp timber types on the western coast of Oregon and Washington show a growth that is probably the greatest of any pulp species in the United States. A recent analysis in the magazine "Pacific Pulp and Paper Industry," shows that the growth of the coast species is about twice that which may be obtained from pulp species in the south and about 2½ times that of the spruce-fir type of New England.

Figures from Dr. Meyer's study show that upon the best sites the average diameters will range from 11.2 inches at 40 years of age, to 23 inches at 70 years of age. The yields on these best sites at 30 years are approximately 5,000 cubic feet per acre, while at 70 years the yield will be 21,000 cubic feet per acre. These figures are based in what are termed normally stocked stands, and will not be obtained over large units, and a reduction of perhaps 15 to 25% should be applied when considering yields over large areas. Upon average sites, such as are found over the greatest portion of the Olympic Peninsula, average tree diameters will range from about 7 inches at 40 years to 13½ inches at

70 years. The volume per acre found upon these average sites for 70-year-old stands will run approximately 14,000 cubic feet for normal stocking, which will be reduced to about 11,000 cubic feet per acre for average stands within the region.

Upon the Olympic Peninsula, where there is a considerable variation in the timber producing capacity of the land, the average rotation for the production of pulp timber is considered as 70 years. At this age, as stated previously, the average diameter will be about 13½ inches, with the majority of trees running from 11 inches to 22 inches in diameter. Upon the better sites, trees of this size can be obtained in 35 to 45 years, and instances of pulpwood cutting at this early age are quite common in certain portions of Grays Harbor County at the present time. However, this cannot be considered the average rotation for pulp species, since this rapid growth is obtained only upon the best sites, which comprise only a small proportion of the entire area suitable for pulp wood production. At 70 years of age the average annual growth is considered at about 200 cubic feet per acre, which is equivalent to approximately 20 cords per acre per year.

The total estimated commercial timber volume on the Olympic Peninsula is estimated at approximately 15½ billion cubic feet, of which about 10 billion, or 65% is composed of pulp timber species. The largest volume of pulp species are in Jefferson County with 3.2 billion, Clallam County with 3.7 billion, and Grays Harbor with 2.9 billion. Of this 10 billion cubic feet of pulp species, western hemlock comprises 68%, silver fir 22%, and Sitka spruce 10%.

In working with western hemlock, whether from the standpoint of pulpwood or saw-timber, it has been found there are two classes or types of trees occurring in the forest. These are the old growth under-story type for one, and the even-aged, second growth type for the other. The former class has the heavy limbs, long crown, large knots and irregular trunk, and is subject to disease and parasites, in the form of rot and mistletoe. This class is usually found in mixture with old growth Douglas fir and cedar and occurs as an understory tree. The second class has tall clear boles, small knots with a regular rounded trunk, and comparatively short crown, and forms almost pure stands of hemlock.

In dealing with the timber management problems of pulp timber stands, foresters are confronted with several problems from the economic side which should be solved through cooperation with the pulp industry. These are as follows:

1. What is the most suitable size of log, from the standpoint of handling in the pulp mills, that can be produced under forestry practice in the future? (It is realized that future timber sizes

will be considerably smaller than they are at the present time.)

2. How does the rate of growth (wide rings vs. narrow rings) affect the quality of pulp, and is there any difference in quality in pulp produced from second growth trees as compared to old growth trees?

3. The pulp industry on the Peninsula is now based on the cost of logs barely sufficient to cover logging and transportation costs. In other words, the industry exists upon a sort of subsidy, inasmuch as hemlock logs are carried to a certain extent by Douglas fir with which the hemlock is logged. Can the pulp industry in the future exist on a higher level of log prices which will result when the large volume of Douglas fir has been cut out and the price of hemlock will depend upon the cost of logging this species alone?

These are some of the questions that have occurred to me, which foresters and those in the pulp and paper industry should meet in trying to solve the question of a continuous supply of pulp timber for the stabilization of the pulp and paper industry on the Olympic Peninsula.

### NEW COAST TAPPI MEMBERS

Mr. Donald K. MacBain, plant engineer for the Pulp Division Weyerhaeuser Timber Company, Longview, Washington recently became a member of the Technical Association of the Pulp & Paper Industry. Mr. MacBain graduated from the University of Washington in 1922 and also studied at the Lewis Institute. Before becoming plant engineer for Weyerhaeuser he was with the Crane Company, the Olympic Forest Products Company and Mr. O. C. Schoenwerck, consulting pulp and paper mill engineer.

Another new member is Mr. Trygve Iversen, kraft mill superintendent for Pacific Mills, Limited at Ocean Falls, B. C. He is a graduate of Carolinska Larovarket, Orebro, Sweden, and was formerly superintendent for the Brown Corporation at La Tuque, Quebec; the Wayagamack Company at Three Rivers, Quebec; the Queensland Pine Company at Queensland, Australia; The Dryden Pulp & Paper Company, Dryden, Ontario, and the Vancouver Kraft Company at Port Mellon, B. C.

### GORDON LAND VISITS COAST

Mr. Gordon W. Land, of A. Cameron & Company, Kobe, Japanese agent for British Columbia Pulp & Paper Company and several other export pulp and paper concerns on this coast, left Vancouver, B. C., for the Orient on the liner Empress of Canada May 2. He had been spending several weeks in New York and other eastern points.

Mr. Land said that prospects for the coming year were for steadily increased volume of business with Japan. Business conditions were more stabilized there now, and there would not be the same hesitation on the part of buyers as had prevailed some months ago.

With the prohibitive tariff on Canadian pulp removed by Japan, British Columbia Pulp & Paper Company anticipates a big advance in sales in that market. President Lawrence Killam reports substantial gains in sales so far.

The company's Chemipulp installation is now in operation at Port Alice. Within a few days it will be in use at the company's other plant at Woodfibre.

\*Associate Forester, U. S. Forest Service, Olympia, Washington.





Kenneth Shibley

**GIBSON JOINS SHIBLEY COMPANY**

Mr. William R. Gibson, formerly resident engineer for the Rainier Pulp & Paper Company at Shelton, Washington, has become associated with Mr. Kenneth Shibley of the Shibley Company, Incorporated.

In his new connection Mr. Gibson will act as sales and service engineer for the Hall Laboratories boiler feedwater system, which is widely used by pulp and paper mills on the Pacific Coast, and which the Shibley Company represents in the Pacific Northwest.

Mr. Gibson will also sell and service the line of combustion control equipment built by the Hagan Corporation of Pittsburgh, Pennsylvania, for whom the Shibley Company are representatives. Mr. Gibson's work will be largely with the pulp and paper mills.

The Shibley Company's announcement said in part:

"In cooperation with Hall Laboratories and Hagan Corporation of Pittsburgh, Pennsylvania, Shibley Company has, for a number of years, brought to the largest and finest boiler plants in the Pacific Northwest a sound, logical and economical method for the conditioning of boiler waters which has resulted in ma-

terially reduced costs, increased output and freedom from numerous operating difficulties. In the belief that Hall system and Hagan phosphate is the only true solution of the problem of successfully and safely controlling scale formation in boilers occasioned by the use of silica bearing waters encountered in this area, it will be our constant endeavor to widen this service to the greatest possible extent.

"Mr. Gibson's broad experience and ability in the design, maintenance and operation of steam generating plants backed by the nation-wide service of Dr. Hall and his associates, permits us to offer to owners and operators a combined sales and engineering service covering every phase involved in the efficient and economical operation of such plants.

"Mr. Gibson's services will be available to present and prospective clients, and users of the Hall system of boiler water conditioning and on all matters relating to the care of steam boilers, removal of scale and corrosion, and generally for the economical generation and utilization of steam."

Mr. Kenneth Shibley is well known throughout the Pacific Northwest as an authority on water treatment and filtration. He has designed and built a number of modern water filtration and treating plants for pulp and paper mills on the Pacific Coast.

**MARCH NEWSPRINT STATISTICS**

Production in Canada during March, 1936, amounted to 243,900 tons and shipments to 239,253 tons. Production in the United States was 76,507 tons and shipments 74,300 tons, making a total United States and Canadian news print production of 320,407 tons and shipments of 313,553 tons, according to the News Print Service Bureau. During March, 24,095 tons of news print were made in Newfoundland, so that the total North American production for the month amounted to 344,502 tons. Total production in March, 1935, was 309,370 tons. There has been no news print production in Mexico since January because of labor troubles.

The Canadian mills produced 105,099 tons more in the first three months of 1936 than in the first three months of 1935, which was an increase of seventeen and nine tenths percent. The output in the United States was 3,912 tons or one and seven tenths percent more than for the first three months of 1935, in Newfoundland 6,519 tons or eight percent less, and in Mexico 5,630 tons less, making a net increase of 96,862 tons, or ten and eight tenths percent.

Stocks of news print paper at Canadian mills were reported at 96,254 tons at the end of March and at United States mills 18,163 tons, making a combined total of 114,417 tons compared with 107,563 tons on February 29, 1936. There was still much tonnage at points from which water shipments will be made later.

**FOUR COMPANIES GRANTED CHARTERS TO MANUFACTURE WOOD PULP IN MANCHURIA**

Charters for the establishment of four new wood pulp manufacturing companies in the form of juridical persons were granted by the Finance Ministry of the de facto government. The four companies are announced to be the Manchuria Pulp Industrial Company, the East Manchuria Pulp Manufacturing

Company, the Japanese-Manchukou Joint Pulp Manufacturing Company and the Oriental Pulp Manufacturing Company. Effective for 25 years, the charters granted by the Finance Ministry stipulate that in order to effect sufficient protection of the country's forests, the annual output of the new enterprises should for the time being not exceed 10,000 metric tons in each category of production. Assistant Trade Commissioner Carl H. Boehring, (Tokyo.)

**FINNISH MILLS MAKING MONEY**

The Finnish Paper and Timber Journal for April 15th reports that a number of Finnish pulp and paper mill organizations made excellent profits during 1935.

At the annual meeting of Enos-Gutzeit O. Y. the directors authorized a dividend of 10 per cent.

The directors of Veitsieluoto Osakeyhtiö voted a dividend of 6 per cent.

The general meeting of A. B. Kemi O. Y. decided on a dividend of 12 per cent to be paid from 1935 profits.

Nokia Aktiebolag voted a dividend of 8 per cent.

Faneeritehdas Hame O. Y. authorized a dividend of 10 per cent.

Tervakoski O. Y. voted a dividend of 12 per cent for 1935, the same as was paid from 1934 earnings.

**Enso-Gutzeit to Expand**

The Enso-Gutzeit sulphite mill at Kotka, Finland, will be enlarged this year, the capacity being doubled to a total of 60,000 tons per year.

**EUROPEAN SULPHITE CARTEL LIMITS EXPORTS TO 2,500,000 METRIC TONS**

In a recent meeting of the Sulphite Pulp Suppliers in Stockholm, at which producers from Norway, Finland, Sweden, Czechoslovakia, Austria, Germany and Memel were represented, it was decided to limit exports of sulphite pulp by cartel members for the current year to 2,500,000 metric tons. This sum represents an increase as compared with 1935 of about 150,000 tons. Capacity production for all countries mentioned is estimated at around 4,100,000 metric tons, of which 2,650,000 metric tons represents the combined production of Norway, Sweden and Finland. These countries will thus share the bulk of the increase. The above decision is very welcome so far as it seems to indicate improved sales possibilities for sulphite pulp, prices for which have also risen recently. The present production curtailment of 25 per cent will continue in effect regardless of the new export agreement. Vice Consul Walter C. Dowling, (Oslo).

**BRAZILIAN GOVERNMENT REFUSES TO GRANT OFFICIAL EXCHANGE**

A petition submitted by the Fruit Exporting Syndicate soliciting official exchange for use in paying for importations of citrus fruit wraps was refused by the Minister of Finance. In justification of his action, this official stated that all available official exchange now in the hands of the government would be required to meet payments on the foreign debt and similar purposes. He added that the concession granted some time ago in the case of newsprint was considered essential in view of the importance of the press as a social and cultural institution. (Trade Commissioner J. Winsor Ives, Rio de Janeiro.)



William R. Gibson

### McMASTER REVIEWS NEWS PRINT SITUATION

Increase in the price of newsprint to at least \$45 a ton is not unreasonable, but no change is likely before the end of the year, according to A. E. McMaster, vice-president and general manager of Powell River Company, largest newsprint producer on the Pacific Coast.

Reviewing the newsprint situation for Pacific Pulp & Paper Industry, Mr. McMaster said that newsprint manufacturers were unanimous that a further advance in price was justified, and that an increase next year was inevitable. He believes that the industry should have stood firm for a higher price than \$41 this year, although a combination of factors made it impossible to maintain a higher rate. He hopes that these factors will not be present when the manufacturers get together to set a fair price for their product this fall when next year's contracts are negotiated.

"The one dollar increase which we put into effect last winter for 1935-36 sales is absolutely inadequate and everyone knows it," said Mr. McMaster. "It represents only about one quarter of the increased costs that newsprint mills have been saddled with during the last year or so in the form of higher wages for labor, costlier woods and materials and increased prices that must be paid for equipment and replacement.

"As everyone knows, many of the eastern Canadian newsprint mills are in receivership," continued Mr. McMaster. "That in itself should be a definite indication that newsprint prices are not sound. These mills are dependent solely on sales of newsprint for their income. If the price received is not enough to permit these companies to operate on a sound economic basis it is obvious that there is something wrong with the price."

Mr. McMaster recognizes the fact that many of the mills now in difficulties were launched at a time when boom conditions prevailed, and at excessive capitalization. When consumption of newsprint suddenly dropped the mills were forced into receivership, but there are several plants that even under ordinary circumstances would be regarded as soundly financed are now unable to show a profit with prices at their present level.

Powell River Company, by virtue of its ideal location, tidewater connections, comparatively low cost of water and pulpwood and other advantages, has really been in a class by itself during the past few years of depression. The company has suffered, of course, but to nothing like the extent of eastern mills that, in addition to higher costs of operation, have had a much more keenly competitive market. But even with all its advantages Powell River Company has found that the present price of newsprint is out of all proportion to production costs, and that an advance must come before long.

"There is a better feeling throughout the newsprint industry," reported Mr. McMaster, "and when I say that, I do not refer only to business conditions and improvement in the market. I mean that there is a better spirit of co-operation among the mill operators, a realization that there must be more team-work and less ruthlessness and selfishness. This applies not only to the newsprint men as among themselves but in the feelings of the newsprint industry towards the consumers of newsprint. I believe that

if a situation existed where the newsprint industry absolutely dominated the market and could dictate terms to the publishers they would be reasonable and fix prices not on the basis of the highest figure that could possibly be got, but on the basis of production cost plus a sensible profit in consideration of the publishers' real ability to pay. Such a policy would not be dictated by a sudden desire to be philanthropic, but by a realization of what is good business and common sense. There should be no more desire on the part of the newsprint industry to exact from the publishers an unreasonably high price than an attempt by the publishers to force too low a price on the producers. The relationship of the two interests is too close to make any other policy sensible. An impoverished newsprint industry can mean only trouble for the publishing business."

The attack on the Canadian newsprint industry led by W. G. Chandler, chairman of the newsprint committee of the American Newspaper Publishers Association, at the annual convention of that body in New York, is not taken seriously by British Columbia newsprint manufacturers, Mr. McMaster recalls that similar attacks have been made previously on the industry with the apparent purpose of forestalling action when the price of newsprint seemed headed for an early rise.

British Columbia newsprint men regard Mr. Chandler's charges as unfortunate inasmuch as they may discourage the re-establishment of mutual confidence between the two industries. They believe that Mr. Chandler's warning of a Canadian government monopoly in newsprint is ill-founded, and that his suggestion of a boycott and development of other non-Canadian sources of supply is hardly practicable under present conditions.

A contrasting view of the newsprint situation is taken by buyers of Canadian newsprint in Great Britain. John Cowley, chairman of Daily Mirror Newspapers, Ltd., at the annual meeting of that organization, stressed the need of publishers to make arrangement for newsprint supplies well ahead, and at fair prices, in order to protect their future position. The steadily improving technical position of the newsprint industry was emphasized by this authority as a factor in the newsprint policy of the publishers today.

Mr. Cowley said:

"Last year I reminded you of the very low figure at which newsprint paper was selling on the other side of the Atlantic. The price to the publishers had drifted downwards to such a figure that it was impossible for but very few newsprint manufacturers in Canada to earn sufficient to cover debenture interest, let alone pay any kind of dividend on preference and common shares.

"A slight, but very slight, turn for the better took place at the beginning of this year when it was agreed to hoist the price of newsprint per ton by one dollar. This, it is felt, is just the beginning of a gradual improvement in price, which, we expect, will in due course tend to a definite recovery in the newsprint industry, leading eventually to sufficient profits being earned to pay something on the preferred and common stocks of the various companies over there.

"There is, of course, still a fair margin to fill up before the maximum out-

put of newsprint is reached in the industry in Canada, and when this margin is filled it behooves publishers in the U. S. A. to look to the future and protect their supplies. Too many American publishers are relying upon the low price and the present plentiful supply of newsprint paper, but as time goes on and the general recovery in the U. S. A. continues, it is anticipated that many publishers who have not protected themselves are likely to be faced not only with difficulty in securing their requirements, but also with the prospect of paying a much higher figure than they would have been called upon to pay had they looked ahead and made definite arrangements for their supplies at a fair price to the manufacturers."

### EXPECT NEWS PRINT MERGER

Merger of three Quebec companies and three Ontario companies is expected to materialize within a few weeks in an effort to bring about more stability in the newsprint industry. Developments are being closely followed by operators on the Pacific Coast who believe that such a consolidation would remove the possibility of another price war this winter.

Hard-headed leaders of the newsprint industry still feel that the trade is "basically unsound" and that some drastic measures must be taken to build up several mills to a stronger financial footing. Mortgage debts and fixed charges would be written down to a point where, with the injection of new capital, operations could be restored to a profitable basis.

Reorganization of individual mills is not regarded with much favor because it does not avoid, but instead, only accentuates the danger of ruinous competition within Canada. Underwriting of the new money required is said to have been underwritten by a strong American and British banking group. Details of the plan are not yet revealed.

### SUPERINTENDENTS' ASSOCIATION APPOINTS FIELD SECRETARY

The American Pulp & Paper Superintendents' Association has announced through President Charles Champion the appointment of Mr. George W. Craigie as field secretary. He assumed his duties March 16th and his headquarters will be at Miamisburg, Ohio.

Mr. Craigie is well fitted for his new work by education and experience. He studied at Bowdoin College and the Massachusetts Institute of Technology, and immediately went to work for the S. D. Warren Company of Cumberland Mills, Maine, remaining with that organization for a number of years.

As executive secretary of the Poland Springs, Maine, 1934 convention of the Superintendents' Association, Mr. Craigie first served the organization. His father, the late Mr. Hugh Craigie was a former superintendent for the S. D. Warren Company.

Mr. Craigie will travel among the eight divisions of the Superintendents' Association assisting them in organizing more effective educational work among their members, aiding in the arranging of conventions and performing miscellaneous duties to further the aims of the Association.

His first work will be in connection with the Superintendents' convention at Grand Rapids, Michigan, June 24, 25, and 26th.

# T · R · A · D · E • T · A · L · K

of those who sell paper in the western states

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## KELLY PAPER COMPANY FEATURES SELF-SERVICE, LOWER COSTS

Despite the old phrase "there's nothing new under the sun," and the recent song hit "Everything's Been Done Before," some one appears with a new idea every once in a while and shows the world that it's possible to apply new principles to an old form of business and make a success of it.

J. Arthur Kelly has done this in the paper jobbing game in Los Angeles. He has had years of jobbing experience, plenty of time to spot the weak spots in the orthodox methods, and opportunity of testing out some points of his theories. So when he started his own jobbing house recently, he put his ideas to work, and the result has been the creation of a new type of paper merchandising.

Big warehouses, large staffs of salesmen, office workers, delivery trucks, and all things that go along with the usual business of paper jobbing, cost money, and the customer must naturally pay for such service, credit, etc. It's worth it to many buyers, but Mr. Kelly felt that the small buyer, printers who purchase in small lots, would be glad to be able to buy his paper without paying for the customary service. His idea was to provide a means whereby the purchaser might provide his own service and save money on small lot buying.

This was the plan in starting his paper house. The Kelly Paper Co. operates on a cash and carry basis. Customers serve themselves, pay the purchase price, and drive away with the paper. In this way there is little need for salesmen or a large office staff, which runs up the overhead which must be charged against small purchases.

To start with, Mr. Kelly and his son, J. Arthur Kelly, Jr., chose a one-story garage building for his new location, at 11th and Los Angeles streets. The type of building assured easy access to street and alley, making possible the convenient drive-in service. A small office was provided at the front on one side, and the entire remaining space was left available for warehousing.

Stock is carried in bins constructed for the various sizes of printing papers, and need be handled only once when coming into the warehouse. Customers are permitted to look over the stock, pick out what they want, and load it on their own trucks, which have been driven into the building. The essence of the plan is to reduce selling costs, hence customers are urged to serve themselves.

Only two men are required to handle the warehouse stocks and look after the customers. Handling is simplified by the fact that all paper is carried on the

one floor, and each stock section may be easily reached from the center drive way.

The plan is designed on a "base price plus surcharge" basis, and is intended to appeal particularly to the smaller buyer interested in economy rather than service. The base list approximates that of other houses on large orders, and for small orders, broken lots, credit service, etc., a surcharge is added to this base price. Thus, by serving himself and helping to keep selling cost and overhead down, the buyer is able to purchase small quantities without having to pay for the usual handling charges.

For instance, a printer drives in, selects a broken lot of stock, counts it, loads it on his truck and drives up to the cash register to pay. His cost is the base price plus 10 per cent. This is a weighing charge, to take care of any difference in weights that might arise in small lot counting and weighing.

When the warehouseman counts, wraps and weighs the broken lot, instead of the customer doing it, a 25 per cent surcharge is added. If credit is desired, an extra charge of 1½ per cent is made; but if the buyer pays cash, the cost of credit and accounting is not included in the price he pays.

The company has no delivery service of its own, and when a customer wants delivery, it is made by a local package delivery firm, which charges 15c for the first 100 lbs., and 5c for each additional hundredweight.

In this way, the cost of merchandising has been stripped to the bare essentials, and the customer pays for what he gets, and gets what he pays for.

### COLTON IN LOS ANGELES

L. A. Colton, director of purchases for the Zellerbach Paper Co., with headquarters in San Francisco, spent a few days in Los Angeles the last week of April, and for the first time saw the new offices and warehouse of the company in the southern city. It is reported that he was impressed by the new building and went home full of praise for it.

### CRAFTSMEN TO MEET IN SAN DIEGO

The Pacific Coast conference of Craftsmen's Clubs will be held at the San Diego Hotel, San Diego, from June 19 to 21. It will be attended by paper men from all over the Coast, as well as by printers.



EDWARD N. SMITH ELECTED  
PRESIDENT

The Los Angeles Paper Mill Men's Club met at the Terminal Club at noon, April 23, and elected Edward N. Smith as president of the organization for the ensuing year. He had served as vice-president since the inception of the organization, and succeeds Frank Philbrook, the club's first president.

Other officers were moved up a notch, Neil B. Sinclair becoming vice-president, G. D. Megel secretary and Geo. Wieman, the only new officer, was elected treasurer. Mr. Philbrook will continue as chairman of the executive committee.

After a rising vote of thanks to the retiring president, Mr. Smith, as his first official act, appointed a sergeant-at-arms to preserve order and dignity at meetings and for such other purposes as might be necessary. For this post he chose Russ Attridge, who he described as a "two-fisted man."

To make the club interesting and useful to all, Mr. Smith proposed that at future meetings two members be asked to tell about their lines and the companies they represent, so that all may get better acquainted from that standpoint. He also suggested that the birthdays of members be ascertained, so that each meeting might be a birthday party and inject fun and good spirit into the gatherings.

Al Hentschel, Les Remmers and A. A. Ernst were appointed by the new president to act as a "sick committee," to send cards or arrange calls on club members who are ill. The suggestion of Mr. Megel that a "bail bond committee" also be appointed, was generally regarded as good, but was tabled for future action.



"NON-USERS  
ARE THE  
LOSERS"

TENAX  
FELTS

## FINISH AND TRIM

### Performance, Cost, and Schedules

Given all kinds of time for careful "makeready" and a slow schedule of operation, almost any machine in any mill can run acceptable paper. Output that stays put the first time shipped. BUT, the real test comes in busy days like these. When production schedules are speeded up, with quality requirements equally exacting. THAT'S WHEN experienced papermakers clothe their machines with TENAX FELTS for Low Costs on Long Runs, for Better Finish with Pronounced Savings in Finishing Costs.

*"Non-Users Are the Losers"*

## LOCKPORT FELT COMPANY

NEWFANE, N. Y.

Pacific Coast Representative: ALAN C. DUNHAM, Portland, Ore.

#### OBERWEISER SPEND WINTER IN SOUTHWEST

E. A. Oberweiser, president of the Whiting-Plover Paper Co. of Stevens Point, Wis., has been spending part of the winter in Arizona and Southern California, and was in Los Angeles most of April. He returned East about May 1, leaving Mrs. Oberweiser here for a while longer.

#### CARL FRICKE ON HIGH SEAS

Carl H. Fricke of Taverner & Fricke, Los Angeles jobbers, and president of the Pacific States Paper Trade Association, left Los Angeles April 7 with his family on his long-projected tour of England, Holland, Germany, etc.

#### WHITING VISITS INLAND EMPIRE

S. R. "Cy" Whiting, Los Angeles manager for the Inland Empire Paper Co., went to Spokane early in April, and spent ten days with executives of the company at Millwood, where they are planning extensive equipment changes.

#### BROUSE GOES TO SEA

Chas. L. Brouse, sales manager for the Pacific Waxed Paper Co., who holds forth in Los Angeles, is now a nautical man and entitled to be addressed as "Captain" or some similar title. He is now the owner and master of a 57-ft. auxiliary ketch, the "Valiant," which had been built for cruising in the South Seas.

He keeps her at the Fairhaven yacht harbor at San Pedro, and ventures forth on week ends to cruise the broad Pacific. This summer he will probably make a cruise to the Gulf of California to do a bit of fishing.

#### OPERATING COSTS OF LIGHT DUTY TRUCKS

Paper distributors that use fleets in which trucks of a rated capacity of one and one-half tons or less predominate will find many points of interest in Operating Costs of Light Duty Trucks, a report issued by the Policyholders Service Bureau, Metropolitan Life Insurance Company. The information lends itself readily to comparison with one's own records because, so far as possible, the statistics given are qualified by descriptions of the circumstances in each case; further, the tables included give operating statistics of fleets for which identical accounting methods are used.

There are 24 detailed operating cost tables in the report. With but one exception, they are comprised of original recent material taken direct from the operating records of companies that cooperated in the survey upon which the report is based. Various breakdowns are represented by these tables: by truck capacity, by length of route, by total mileage, by states, by geographical regions and cities. The cooperating companies operate in manufacturing, retailing and public utility fields.

Notwithstanding the marked increase in the use of motor truck transportation in industry and commerce, there has been scarcity of usable data on truck operating costs. This new report, by quoting and analyzing actual records in the light duty truck classifications, adds measurably to available information. Any reader who wishes to study the details of this report may obtain a copy by writing to the Policyholders Service Bureau, Metropolitan Life Insurance Company, One Madison Avenue, New York, N. Y.

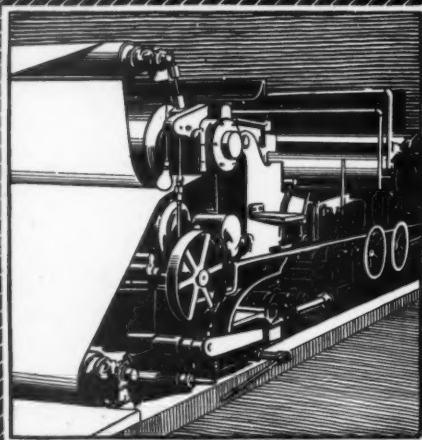
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Power  
Service

To foster industrial development in the territory it serves, this company has a group of specialists whose job it is to assist you in solving your electrical problems.

These specialists are at your service without cost or obligation. Why not call our nearest office and give us a chance to help you?

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## Definite Advantages

You will find the Orr a better water extruder—a better felt—reducing to a minimum the work on the dryer.

You will find that Orr felts last longer—reducing the annual felt bill by hundreds, perhaps thousands of dollars.

The above statements can very easily be proved—have been proved in mills sufficiently interested to conduct operating tests—first on one make of felt, then on another.

Put on a test in your own mill. Give the Orr brand of felts an opportunity to prove that they are a superior make.

Complete line in all required sizes and weaves, including endless felts up to 86 feet in length.

### The ORR FELT and BLANKET COMPANY

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# ORR FELTS

## ELECTRIC TRUCK ACCIDENTS

Accidents continue to occur that in one way or another involve the use of electric trucks which are being used a great deal more in material handling than was the case several years ago. Running into objects, failure to sound warnings, speeding around corners, improper piling of material on the truck and borrowing for a ride by an inexperienced operator are only a few of the causes of these accidents.

The Three Rivers, P. Q., mill of the Canadian International Paper Company, recognizing sometime ago the increasing hazards caused by electric trucks, issued a set of rules or instructions for their safe operation.

In addition, employees for this job are carefully selected and are thoroughly trained and instructed as to the equipment and its operation.

If your plant uses electric trucks you will be interested in this set of instructions. They are as follows:

1. No one but the men especially appointed for the purpose are to operate the electric trucks.
2. A limited number of operators should be appointed.
3. Their names should be listed and kept on file. The Manager, General Superintendent, Electrical Superintendent, Repair Superintendent, Finishing and Safety Supervisor should be furnished with copies of this list and advised of any changes made.
4. Upon taking charge of a truck the operator's first duty is to make a personal inspection of the truck.
5. Making sure that the brakes are in order.
6. Making sure that the electric controls are working properly.
7. Making sure that scoop cables on paper loading trucks are not frayed.
8. It is forbidden to use a truck that is not in good condition.
9. Trucks that are out of order are to be reported or brought at once to the Mechanical Department or Electrical Department as the case may necessitate.
10. Truck operators must not leave truck without removing control handle and further pulling out the connecting plug if truck is to be left standing for any length of time.
11. Operators should not forget at any time they are responsible for the safe operation of their trucks, and it is up to them to see they are in order before and while using them.
12. The trucks represent a fairly heavy investment and should be operated properly, and not used for purposes other than they were meant for.
13. Care should be taken by operators to sound their horns when approaching and passing communicating doors, entrances, exits, corners, etc.
14. Operators must not, after blowing their horns, take it for granted the road is clear—they must assure themselves it is so before proceeding.
15. They should come to a dead stop before entering paper mill from finishing rooms, sound their horn and then proceed cautiously between machines, using horn as necessary.
16. Only one paper loading electric truck is to be allowed on the elevators at one time.
17. Operators are not to allow anyone to ride on platforms or scoops of trucks.
18. Should any employee impede the operation of the truck, the operator should report this man to the employee's own Superintendent, as the employees themselves should cooperate with truck operator in the prevention of accidents.